THE GARDEN JOURNAL

OF THE NEW YORK BOTANICAL GARDEN

Free Saturday Afternoon Programs start October 1, 1955 in the Lecture Hall of the Museum and Administration Building of The New York Botanical Garden.

Annual Children's Flower Arrangement Competition, Saturday morning, October 22, in the Museum and Administration Building of The New York Botanical Garden, sponsored by the Volunteer Associates in cooperation with the Office of Nature Study and School Gardens, Board of Education, City of New York.

Chrysanthemum Show in the Conservatory opens November 4, 1955, and will run until the middle of December.

Theater Benefit for The New York Botanical Garden — see page 171 of this number of The Garden Journal.

THE GARDEN JOURNAL
of The New York Botanical Garden

DOROTHY EBEL HANSELL
Editor

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Cover illustration from **Hieutei Buch,** photograph of original plate, by E. N. Mitchell; p. 142, The New York Botanical Garden; pp. 147, 148, lower, Edward B. Lloyd; p. 148, upper, Ruth and Phil Alampi; pp. 149, 150, L. I. Agric. & Tech. Inst.; p. 155, The New York Botanical Garden; pp. 156, 157, 158, Gottscho-Schleisner; pp. 161, 162, upper 163, The New York Botanical Garden; p. 162, upper left, p. 163, page 164, lower, Roche; p. 164, upper, Gottscho-Schleisner p. 171 E. N. Mitchell.

AMONG OUR CONTRIBUTORS

JEAN HERSEY and her husband, Robert, are now engaged in teaching people to "re-educate themselves in the art of seeing." Their home in the hills of Westport, Connecticut, is a haven for those who suffer sight difficulties. And since Jean is not traveling thither and yon and writing books, and her husband no longer commutes to an advertising agency in New York City, they are thoroughly enjoying their orchids and the other attractions of country life . . . SPENCER CAPREAL is deeply interested in the culture of top-quality chrysanthemums, keeps informed on the latest procedures and puts them to test in his Westchester garden . . . A native of Canada and a graduate of Ontario Agricultural College, DR. A.M.S. PRIDHAM undertook post graduate studies at Cornell University where he has been on the staff since 1925. He has published bulletins on phlox, peony, iris, gladiolus, and on staging flower shows from the New York State College of Agriculture and his research papers have appeared in the Proceedings of the American Society for Horticultural Science and Northeastern Weed Control Conference. He is editor of "New York Nursery Notes" for the N. Y. State Nurserymen's Association and of "Shade Tree Notes" for the N. Y. State Arborists' Association. Dr. Pridham has recently carried on research studies in weed control, defoliation as a harvest aid in nursery stock, cold storage and packaging of nursery stock, and corrective procedures for iron deficiency in ornamental plants. At the 1952 convention of the American Association of Nurserymen he received the Norman J. Colman Award for outstanding research . . . EDWARD B. LLOYD has served four terms as president of the American Dahlia Society and a like number as president of the Dahlia Society of New Jersey and is currently secretary of the former organization and chairman of its Trial Garden Committee. In order to pursue his hobby of originating and exhibiting dahlias, he has found it necessary to continue his profession as a highway construction engineer since leaving Amherst with the class of 1911 . . . DANIEL DOWD is an instructor in horticulture at the Long Island Agricultural & Technical Institute, Farmingdale, L. I. . . . DR. H. W. RICKETT is Bibliographer of The New York Botanical Garden . . . AUGUST P. BEILMANN has been with the Missouri Botanical Garden since 1926 — the first five years as arboriculturist, since then as manager of the arboretum at Gray Summit. He is a member of the American Association for the Advancement of Science, National Shade Tree Conference, and other nature, conservation, and nursery organizations; author of many articles and the book, *What Tree Shall I Plant;* and an associate of Dr. Hermann von Schenk in many court cases involving trees, timber, and damage to woodlands. All his life Mr. Beilmann has enjoyed nature in its many aspects and has hunted and fished and floated most of Missouri's rivers, including the Missouri and Mississippi . . . JAMES M. GIBB is an outstanding professional gardener, superintendent of "Chelmsford," the beautiful estate of Mrs. Elon Huntington Hooker at Greenwich Connecticut . . . HOWARD SWIFT is Assistant to the Curator of Education and Horticulturist of The New York Botanical Garden . . . EMILY GIBSON LATHAM has long been a student of languages and botany and is a graduate of the Lowthorpe School of Landscape Architecture in Massachusetts. Her enthusiasm for languages and botany has led her to delve into the stories behind plant names . . . GERTRUDE B. FOSTER is editor of "Herb Grower Magazine."

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The Most Glamorous of All -- Orchids --

By **Jean Hersey**

ORCHIDS ARE lovely plants to grow. If you've a small greenhouse, you're all set and can't miss. What pleasure is ahead. And always remember the sky is the limit!

My husband and I grow orchids for the pure joy of watching them, and having them about. We like their whole process of growth. We enjoy seeing the new pseudo-bulbs push up through the osmunda, or branch off from other bulbs—so different with each plant. We eagerly await the appearance of the flower sheath. How interesting is the silhouette of the bud inside the sheath. And, of course, the climax occurs when the heavy blossom emerges, unfolds, and finally raises its head erect.

Orchids are plants with personality plus! Character, charm, beauty they have. Orchids have everything, and in addition they are easy and require but little care.

Four years ago we moved to Connecticut and built a modern house with a small 8 x 10′ greenhouse opening off the living room. Here we grow nearly a hundred orchid plants of about twenty different varieties. When we open the double glass doors that separate the greenhouse from the living room, the whole place is fragrant with the scent of these lush tropical beauties. We have planned it so that orchids will be part of our daily life — not off in a corner where we must take a trip to see them — and part of our life they are. When we have company for dinner, the table is placed near the opened greenhouse doors, and we are all but surrounded by the plants.

We have orchids for breakfast and lunch, too — the greenhouse is just large enough for a table for two. There we are in the midst of the plants which grow in hanging baskets made of wooden strips. Some are on bits of bark, and others cling to the twisted branches of an old greyed dead tree limb. Along with orchids we have Spanish moss dripping, and ferns, too. In total effect, it is as if a small slice of Latin American jungle had been transplanted to Connecticut. We eat our grapefruit and breakfast toast amidst the wonderful tropical scent of things growing, while the snows of January are piled up outside, and the sun pours in.

Because of the way our greenhouse is located, one look over my shoulder while I am in the kitchen reveals sprays of *Epidendrum atropurpureum, Lionetianum* also, and *Brassocattleya* 'Daffodil', Mr. Fennell's rare yellow orchid. I can see *Epidendrum radicans* rambling all over the place in gold profusion. Several cypripediums, jaunty and charming, enhance the show, while *Oncidium sphacelatum* with its gold butterfly petals dances through the others.

We have mostly chosen orchids that bloom from October to May, because those are the months when we miss the garden flowers and the fragrance of things growing outdoors.

Our orchids spend a thriving summer down by the brook, growing in the trees. Incidentally, we cut up the wire coat hangers, which are the bane of every housewife's existence, and use them for hanging the plants, both indoors and out. Three months among the mists that float up the meadow along the brook fill them with vigor. When we bring them in just before the first frosts in September, their new flower sheaths are all ready for winter blooming which usually reaches its peak around Christmas.

Now down to the practical for a moment and the mention of some little known facts about orchids. These flowers are, many of them, very fragrant — especially the small spray types. But most of the large cattleyas are also fragrant. All orchids are most fragrant at noon on sunny days. They have almost no scent at night. The flowers last in bloom anywhere from three weeks to three months! This amazes most people, and did us when first we realized it. The flowers of some of our varieties put in an appearance and remain a whole season. Some of the cypripediums, the *Brassocattleya* 'Daffodil', and epidendrums have blooms that last weeks.

Orchids are easy to care for. Once properly potted in clay pots or wooden crate-like baskets, they do not need transplanting for two or three years. We spray water on the tops daily with a fine mist spray, usually early in the morning. We soak the baskets twice a week, and the pots once a week. Orchids like to dry out between waterings. The roots absorb nourishment from air as well as water. The tops take food from water as well as air. So humidity — and plenty of it — is one answer. I often spray the tops several times a day if I am about and think of it.

There are two schools of thought on fertilizer. Those who believe in it and those who don't. We fertilize once a week — and notice quite a difference if we forget it for a few weeks.

Orchids like cold nights. They will not bloom very well if there isn't a nightly drop in temperature. We keep our greenhouse 55° at night and 65° by day. In the sun the temperature runs up to 80° or so. We have automatically controlled vents that open and shut. This means one can forget the greenhouse in weather changes, and this is, indeed, a great convenience.

Some of our favorite orchids — and ones which do well for us — include

The owner of this well-flowered oncidium can point to it with pride.

Lycaste Skinneri, the white nun orchid of Guatemala. The flowers last sometimes two months on the plant. Deep in the heart of each flower is the small figure of a white nun, a tiny wax-like figure standing before a gold altar. The shell-pink flowers are quite different in texture from those of a regular cattleya, whose petals are heavy and almost like a gardenia in texture.

Lycaste aromatica is a smaller gold cousin to *L. Skinneri.* The petals are pointed, the fragrance spicy, rather like cinnamon — and really fine. It is a good plant for someone who would rather have a number of plants of different varieties than a few large ones. It doesn't take up much room.

One of our favorite cattleyas is 'Remy Chollet,' a good grower and a prolific bloomer. This plant blooms for us after it has been divided and has only three back bulbs.

One of our *Cattleya Percivalliana* plants won a first prize this spring at the Hartford Flower Show. Eight huge fragrant flowers cascaded down the plant.

Brassia verrucosa created a mild sensation with its spiney white blossoms, when we had it on exhibit in the Westport Library last winter. When one of our plants is completely lovely and exciting, we are apt to take it to the local library for a day. In this way many people besides ourselves can enjoy the flowers.

And which orchid do we like the best, people so often ask us. The one that is blooming at the moment. We get tremendously excited about each winter month with its special features. We love to watch the plants grow and send up new pseudo bulbs as well as watch the flowers unfold.

And we are convinced that there are no plants as wonderfully exciting and satisfying to grow as orchids. There is such a wealth of different kinds, you can have any color and size that intrigues your fancy.

Lycaste Skinneri is known as the white nun orchid of Guatemala.

CHRYSANTHEMUMS and TEMPERATURE

Grown Out-of-Doors

By **Spencer Capreal**

SINCE THE CHRYSANTHEMUM enthusiast adopted the growing of standard and exhibition chrysanthemums (sometimes called greenhouse varieties) out-of-doors, it has been observed that varieties with October blooming dates do not always perform on these dates. Some of these varieties produce some very nice flowers on varying dates. Other varieties are very uncertain — sometimes producing defective flower heads or very poorly developed buds. In the metropolitan New York City area, temperature variations are sometimes quite great, beginning in the last half of August and continuing through September and October. In the month of October, it is not uncommon to have freezing frosts and even a snow storm. These October conditions, which could be ruinous to any unprotected chrysanthemum planting, are generally blamed for failures and dissatisfaction, or delays. It would seem reasonable to assume that at least a part of the blame can be placed on October weather.

More recently, experiments at Cornell University indicate that there are other periods whereby temperature plays an important part in delay and dissatisfaction.

Henry M. Cathey, graduate student, reporting the results of these Cornell experiments in the New York Flower Growers, Inc., Bulletin 104 and 112, reveals some very interesting data on the important part that varying degrees of temperature have on the development and blooming dates of chrysanthemums. Mr. Cathey has suggested that they be classified as: Thermozero variety, Thermopositive variety, and Thermonegative variety.

Basically, these three thermo classifications conform with earlier recommendations that chrysanthemums be grown at 60° night temperatures. But these newer experiments reveal some temperature tolerances that were not too well understood before. Thus: Thermozero varieties will produce flowers in a temperature range from 50° to 80° F. Temperatures above or below 60° delayed blooming dates. Thermopositive varieties flower between 60° to 80° F., but did not bloom at the range of 50° F. Thermonegative varieties did well between 50° to 60° F. Above 60° F. buds were initiated but did not develop very well. The important data on these thermo classifications will be found in Table 1.

Mr. Cathey concludes with the following observations that deserve study:

"1. High temperature (80° F.) delayed flowering in all varieties and inhibited flowering of the thermonegative varieties. The plants grown from the 80° F. stock flowered with much shorter stems than plants grown from stock at 50° or 60° F. The same number of days for vegetative growth in early summer and late summer do not produce the same length of stems because of the high summer temperature on the stock, which reduces growth of the late summer planting.

"2. Minimum flowering time was obtained with all varieties, when 60° F. was continued throughout the life of the plant.

"3. High temperature (80° F.) increased the number of buds per spray but at the expense of delay or inhibition of flowering.

"4. Low temperature (50° F.) delayed the flowering slightly in the thermonegative variety. If a grower cannot accurately control his temperature, thermonegative varieties would be less difficult to flower for fall and winter than the thermopositive varieties.

"5. Low temperature (50° F.) inhibited the flowering of thermopositive varieties. The temperature must be accurately controlled at a minimum of 60° F. before flowering can be obtained.

"6. Continuous low temperature (50° F.) reduced the number of flowers per spray on thermozero and thermonegative varieties. Thermopositive varieties did not flower at continuous 50° F.

"7. Thermopositive varieties had more flowers per spray when they were shifted from 50° to 60° F., at the time of propagation or at the start of long dark periods than plants grown continually at 60° F. This increase was due to the formation of compound sprays on plants at low temperature in stock (50° F.).

"8. The thermozero variety, 'Shasta,' flowered in the range 50° to 80° F. There was an equal delay at 50° to 80° F. in the flowering when compared with the minimum flowering time at 60° F."

It would be natural to ask of what value are these controlled greenhouse experiments to outdoor chrysanthemum growers in the New York City area, or anywhere else for that matter. The answer would probably be proper daylengths for bud initiation and development, plus temperature ranges that are conducive to vegetative development.

Commercially, it is quite common for growers to control daylengths with black cloth for summer and early fall blooms out-of-doors, and there are a number of amateurs who also force their chrysanthemums with black cloth for early fall blooms. (See "Forcing Chrysanthemums for Earlier Blooms," The Garden Journal of The New York Botanical Garden, May-June 1954.) The importance of daylength to produce chrysanthemums is quite well established.

The range of temperature tolerances has been an uncertain quantity, although 60° F. night temperature has been the previous recommendation for effective growth conditions. With these later Cornell experiments, we are in a position to compare local outdoor temperatures and better understand the delays and disappointments with blooms.

Temperature is a condition or environment that is connected with growth or dormancy in plants, a rheostat, so to speak, that increases or decreases biological activities within them. In chrysanthemums, vegetative growth can take place above and below these thermo - classified temperature tolerances, but requires the narrower thermo

TABLE 1

THERMOZERO VARIETY
SHASTA 10 WEEK

Treatment	Total # days to flower	# flowers per stem
Continuous 50°	92	5.1
Continuous 60°	71	7.9
Continuous 80°	92	10.2
50° stock, 60° to Fls.	73	5.7
50° to LN, 60° to Fls.	78	7.9
50° to bud, 60° to Fls.	97	8.6
60° stock, 50° to Fls.	92	4.1
60° to LN, 50° to Fls.	87	4.4
60° to bud, 50° to Fls.	78	5.4

THERMOPOSITIVE VARIETY
ENCORE 10 WEEK

Treatment	Total # days to flower	# flowers per stem
Continuous 50°	NF	----
Continuous 60°	71	9.1
Continuous 80°	78	9.7
50° stock, 60° to Fls.	84	13.5
50° to LN, 60° to Fls.	101	17.4
50° to bud, 60° to Fls.	NF	----
60° stock, 50° to Fls.	118	15.7
60° to LN 50° to Fls.	87	8.6
60° to bud, 50° to Fls.	78	8.6

THERMONEGATIVE VARIETY
DEFIANCE 13 WEEK

Treatment	Total # days to flower	# flowers per stem
Continuous 50°	125	4.7
Continuous 60°	92	8.5
Continuous 80°	NF	---
50° stock, 60° to Fls.	97	7.7
50° to LN, 60° to Fls.	101	11.2
50° to bud, 60° to Fls.	93	13.0
60° stock 50° to Fls.	104	5.0
60° to LN, 50° to Fls.	104	7.1
60° to bud, 50° to Fls.	97	6.3

NUMBER OF DAYS IN SECOND COLUMN BEGIN WITH LONG NIGHTS

temperature ranges for proper bud development.

In forcing chrysanthemums, the black cloth is not necessary after color shows in buds, regardless of daylength. By the same token, the critical period for temperature control, for proper bud development, may run parallel with this period. This writer has observed, over a period of years, that once color shows in buds they can tolerate more temperature changes and still produce nice blooms. Dr. Kenneth Post, in his earlier experiments at Cornell (1930-1933), grew chrysanthemums outdoors under aster cloth tents and was able to produce blooms by October 15. The only objection to these blooms, in the disbudded varieties, was that water seeped in through the aster cloth and collected in them. Decayed petals were the result. Temperature at Ithaca, N. Y., in the first half of October is noticeably colder than New York City.

It has been proven that 60° F. night temperatures will produce blooms in the shortest number of days, and the three thermo-classified groups will bloom under varying temperature ranges; but they will be delayed in their blooming dates, if night temperatures go higher or lower than 60° F. (See Table 1, on thermo-classifications, for relative delays with temperature variations.) Let us now see how New York City temperature conditions compare with these Cornell temperatures. In Table 2, we have averages for August, September, and October, for the years 1953 and 1954, taken from the U. S. Weather Reports, Battery Place, New York City. As the night temperature is the more important one to watch, the minimum averages are of more interest. Bud initiation, for October varieties, takes place in the last half of August and develops to a point where color shows in the buds by the end of September. This, then, can be considered the period when temperatures will delay or bring blooms in on time. The minimum averages in Table 2 are not too far away from the ideal temperature requirements. Temperatures will vary, from year to year; frost protection can be used on nights when cold weather is predicted. October conditions are not desirable. The averages in Table 2 are not too bad, but we do sometimes get cold spells that will ruin flowers unless they are protected.

The average New York City night temperature for the latter part of August through September and October, indicate that all three thermo groups can be grown at the New York City latitude, with some protection. In colder sections, thermozero and thermonegative varieties would be recommended with protection and heat.

Garden Varieties

Besides the standard varieties, which have been under discussion here, we do have a large group of varieties that bloom at earlier dates. A few remarks about temperature and daylength for this group should be of some value to the outdoor gardener. For convenience, we shall classify them as garden varieties.

Garden varieties will probably always have a place in the garden. They do make a beautiful picture in late summer and early fall, when planted in groups.

Buds start developing quite early, and the cooler temperatures of September and October do not prevent plants from blooming. Many of these varieties are susceptible to fairly heavy frosts—frost protection will keep them blooming longer.

Many of these garden varieties do initiate buds with short days. For more than a decade, the forcing of garden varieties for off-season blooms has been practised in our New York City area—mostly through the winter months for spring blooms. The results have been comparable to summer-grown plants, but obviously with less blooms. The timing for winter-forced plants may take several weeks longer than summer-grown plants, that is, from the period when bud initiation takes place to bloom dates. Normally in the summer, the time between bud initiation to bloom is around six weeks, and with some of the earlier varieties closer to five weeks. Unseasonably cold temperatures in August and September can delay blooms. Late pinching will also delay blooms.

Frost Protection

We have spoken of frost protection several times. The degree of protection depends greatly upon local temperature conditions. Table 2 gives averages for

From N. Y. State Flower Growers, Inc., Bulletin No. 112—By Henry M. Cathey.

lower New York City. The averages in Central Park and La Guardia Field do vary some from the lower city point. At our own place in mid-Westchester County, temperatures sometimes drop as much as 6° to 10° F. lower than New York City.

For quite some time now chrysanthemum enthusiasts have used coverings of one sort or another to protect their plants. More recently they have tried to supply heat also by ingenious ways. Besides the protective covering, uniform heat circulation obviously makes for ideal conditions for flower development. The uniformity of heat distribution has not been too successful outdoors. However, we now have a method that will probably come closer to an ideal condition of heat distribution, namely, radiant heat of the infrared type.

Radiant heat is not new nor old. It was first tried out on plants in 1935, in France. Several experiment stations in America have carried on work along these lines. Michigan State Experiment Station was first in developing a radiant heating unit that has been successful for frost protection, with vegetables and fruits. These units are about twelve to fifteen feet high, using oil to generate heat. Frost protection has been observed from thirty feet to seventy feet radius from these units without harm to plants —temperatures ranging from 21° to 29° F., conforming with the thirty to seventy-foot radius.

These Michigan units would be quite large for small chrysanthemum plantings, and they offer no protection against rain or snow. There is, however, an adaptation of this radiant heating principle, with heating cables of the chromalox type, that would be convenient to put up and take down. The circulation of heat, from these cables, would have greater consistency and uniformity than spot heaters, and the degree of heat can be better controlled by the number of cables in the arrangement and thermostat setting. The effective value of radiant heat (infrared) is through leaf absorption, regardless of surrounding temperatures.

These heating cables are available and are generally used to prevent freezing or to defrost house gutters, leaders, pipes, and so forth. They are also used in seed beds for soil heating purposes. The heat value, for these cables, generally run five watts for each running foot, and the total value multiplied by the number of feet in length of cable.

TABLE 2

NEW YORK CITY TEMERATURE DATA
AUGUST, SEPTEMBER, OCTOBER, 1953-1954

	1953			1954		
TEMPERATURE °F	AUG.	SEPT.	OCT.	AUG.	SEPT.	OCT.
AVERAGE MONTHLY	75.2	69.1	60.1	71.7	66.9	60.9
DEPARTURE FROM NORMAL	+2.0	+1.8	+3.1	-1.5	-0.4	+3.9
MAXIMUM AVERARGE	83.1	76.6	67.9	78.9	73.9	67.8
MINIMUM AVERAGE	67.2	61.6	52.3	64.5	59.8	53.9
HIGHEST	97	99	79	88	89	85
DATE	29,31	2	1	16	6	12
LOWEST	58	48	39	56	49	38
DATE	2	14	8	12	23	31

U.S. WEATHER BUREAU, BATTERY PLACE, N.Y.C.

There are additional benefits with frost protection that should induce one to build some protection. Chrysanthemums are susceptible to quite a number of diseases, such as fungi, virus, and bacteria. In practically all of these diseases, moisture plays an important part in the spreading of the infection. A properly constructed frost protection, if put up early enough, should prevent or delay most of these conditions.

Constructing a frost protection is not difficult, and it can be built to any size or shape. A skeleton frame, made with pipes, angle irons or wood, with a peak or shed type roof to withstand winds, is fairly inexpensive. Frames should be planned to allow one foot of space around and above plants when fully grown. The height of frame would be governed by the size of plants to be grown. Late plantings (July 1) will produce shorter plants than those planted much earlier. Frames can be permanent or temporary, to be taken down each season.

When the frame is finished, the top should be covered with glass, glass substitute or even a light-colored canvas that is water repellent. Canvas of some sort for the sides, arranged to be pulled around frame in the evening and pulled open in the morning, will do quite well. With this setup, light frosts and damaging rains are kept away from plants.

As previously mentioned, night temperatures are an important factor in producing blooms on time or delayed. Local temperature conditions should govern additional heat requirements. The protective covering will increase night temperatures by several degrees and will probably carry plants through the month of September (until color shows in buds) quite nicely, without causing much delay for blooming dates. Some heat for September may be advisable, but for October it may become necessary to keep body and flower of plant from freezing, to obtain good blooms.

After the top covering is on frame, heating cables can be installed, suspended below reflectors. At our place we use strips of aluminum in ten-foot lengths shaped into a wide inverted vee or half-round. Aluminum strips six or seven inches wide will do. The cables can be arranged to go over the plants or corner-wise, but be careful of kinks — they could break connections. A thermostat suspended a little below the top of plants, in a midway position,

(Continued on page 158)

FALL CLEANUP IN
GARDEN HOUSEKEEPING

By A. M. S. Pridham

SIX WEEKS AGO TODAY I heard a cicada sing, so tonight we'll have a frost. Tomorrow summer flowers will be gone for another year. This Saturday will open the fall cleanup season in garden housekeeping. Trash has no place in a clean house or garden. What cannot be burned may well be disposed of in other ways so that the gardener is assured that few, if any, pests or diseases of 1955 will linger in his garden to make an easy appearance in 1956.

Garden cleanup or sanitation began with the ripening or yellowing of the foliage of the first spring bulbs and has gone on all summer with iris, delphinium, and other foliage, or plants that have gone by, or have showed disease or been troubled by insect pests or other ailments. Garden cleanup also includes weeding, since weeds often harbor pests and diseases that spread to flowers and garden plants.

Leaf fall is a second period of autumn demanding attention. Modern lawn mowers sometimes have leaf mulching attachments. This equipment is useful while leaves are dry and not lying in deep drifts. The mulching attachment provides a convenient way of solving the leaf problem with an element of benefit to the lawn. If tree leaves are plentiful enough (truck loads) they may be used for mulching rhododendrons and other shrubs or for composting or for garden soil improvement by turning them under with a spade, garden tractor or plow. In small gardens leaves are probably best disposed of as waste.

Less obvious phases of fall cleanup in the garden include lawn renovation during September or early October; pruning out dead twigs and limbs from shrubs, trees, and vines; thinning out excessive growth and final (light) trimming of hedges. In gardens where plants habitually do poorly, corrective measures to improve soil drainage may be made by installation of drainage tile, or the incorporation of lime or of organic matter to improve the physical structure of the soil may be all that is needed. Cover crops, too, can be used to advantage.

Fall is a good season to review performance of the various plants: to weed out those that take too much time or that crowd favorite plants unduly; to mark with a stake or label those perennials to be lifted and divided the first thing next spring; to complete any planting of bulbs or lawns; to see that heavy mulch is cleared away from the stems of tender azaleas, hollies, and other semi-hardy plants. The presence of moist or wet mulch against the stems tends to prevent adequate maturing and hardiness of the stems with the result that early fall frosts or sometimes spring frosts injure such half-hardy plants at the ground level with resulting poor growth and sometimes death of the plants. Roses are not entirely hardy in New York State and in low-lying frosty locations should have the soil mounded up about the base of the canes in November when growth has ceased. This last phase of the year's gardening would also include winter shade for boxwood and other broad-leaved evergreens.

TACKLING SPECIAL PROBLEMS

Internal Soil Drainage

Soils which have poor internal drainage usually restrict root growth to the upper few inches to a foot of soil. This restriction applies to trees, shrubs and, in a measure, to grasses. Injury usually occurs in early spring when winter snows and spring rains together provide more than ample moisture. Usually a hard layer of essentially impermeable soil prevents water from seeping down into the sub-soil. The perched or excess water replaces the air between the soil particles and submerges the roots, cutting off the supply of oxygen necessary for their normal functioning in absorbing water and soil nutrients needed for root and top growth.

Later in the season when excess soil moisture disappears, root growth is resumed but restricted to a shallow layer of soil that is soon depleted of the water necessary for normal plant growth; hence, burned lawns appear early, and trees and shrubs make relatively little growth and often shed their leaves during July or August drought. Such plants often show nitrogen deficiency or other yellowing of the foliage due, in some cases, to chlorosis.

Soils may be examined by digging test holes. In the course of digging the presence of hard layers of soil is often evident. Otherwise a post hole two to three feet deep can be made and filled with water. Usually this water disappears in a few minutes; then, immediately fill the hole a second and finally a third time. If the water takes an hour or more to disappear below the one-foot level, the soil can usually be considered as poorly drained and can likely be improved by the installation of tile drainage. If this is not feasible, the gardener may have to modify his choice of plants to include more annual flowers and shallow-rooted plants, while roses and other deep rooting plants have to be regarded as temporary only.

Clay soils may, on occasion, present problems. A good stand of lawn grasses will help to improve such soils, and the incorporation of clovers in the lawn is another worthwhile step. Where clay soils are to be used for garden purposes, the use of rye as a cover crop and of coarse grade peatmoss or similar material as a soil amendment will aid in improving the soil. Under correct conditions of soil moisture other material which tends to aggregate soil particles may be effective when properly applied. Care should be taken to stay off clay soils while they are wet or slick and puddle easily.

Fall operations in the garden may well include the installation of tile drainage where this is needed. Planting of winter rye at the rate of three pounds to one thousand square feet, etc., as a fall cover crop will be useful in soil improvement. The incorporation of coarse grade peatmoss at the rate of one

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DAHLIAS

FOR THE EXHIBITION TABLE

By Edward B. Lloyd

An unnamed seedling not yet introduced by the author, but winner of a certificate at the American Dahlia Society Trial Garden at Rutgers University.

WINNING THE BLUE RIBBONS on the exhibition tables, that is, having the best bloom at the time the blooms are judged, means planning and working the year round. The first requirement is to start with healthy stock of the best varieties (not necessarily the most expensive or latest) and grow it well. Second, the plants must bloom at show time. Third, the finest blooms must be selected. And last, the blooms must be properly conditioned, transported to the show without damage, and staged to show their best qualities.

Prizes cannot be won with diseased stock or inferior varieties, when the competition is keen. In the garden, plants showing evidence of disease should be discarded at once to prevent spread to healthy plants. Reliable commercial growers seldom send out any but the most healthy of varieties, but whenever possible, it is worthwhile to check personally the fields of the commercial grower before purchasing. A knowledge of the best varieties in each class is gained by comparative studies at the shows, in the commercial fields, and in the trial gardens of the American Dahlia Society.

Articles on how to grow dahlias have appeared in the "Bulletin" of the American Dahlia Society and in commercial catalogues, and the American Dahlia Society publishes a pamphlet, "Dahlia Cultural Instructions." Briefly, the requirements are a fertile, deeply prepared soil, supplemented by adequate feeding throughout the growing season; plenty of water to keep the soil moist and the food available; and a definite spraying program to keep the plants free from insects.

For exhibition growing, plants and small roots are preferable to large roots, the reason being that the former must feed themselves early in the season and, therefore, establish a strong system of roots before the hot dry weather sets in. They can then continue growing through this critical period.

On the subject of feeding there is probably more discussion and difference of opinion than on any other phase of dahlia culture. During the early stages of growth the plants require especially phosphates which are supplied by bonemeal or super-phosphate. Potash increases the strength of the stems and, to some extent, improves floriferousness. It is worthwhile to supply potash from midsummer on. Nitrogen is needed when the buds start to form — it increases leaf growth and flower size. A safe dose is two teaspoonsful of calcium or potassium nitrate per plant per week, applied from the sixth week prior to exhibition. Too much nitrate makes the blooms "soft" and then the blooms will not keep well when cut. Therefore, nitrate feeding should be cut down a few weeks before show time.

Watering is fully as important as feeding. If the fertilizer is not in solution, it cannot be absorbed by the plant. For the six weeks before the show, and during the period of nitrate feeding, more and more water must be applied; and from the time the buds start to open, the ground around the plants must be kept at least moist. An excellent way to preserve ground moisture, and at the same time keep the ground cool, is to apply a mulch of organic material such as salt hay, straw, manure, or peatmoss.

Most varieties are best shaded from the time the buds are half open, but some require shading from the time the bud starts to open. Shading protects the blooms from fading of the color by sunlight and from bruising by rain and wind. Clean bushel baskets may be used for this purpose, with care being taken to prevent the petals from being damaged by contact with the basket. The writer uses dump-wagon umbrellas for spot shading. In localities with very hot summers, a lath roof is an excellent method of providing shade for the whole garden, and growth will not be checked during hot spells.

When growing dahlias for shows, timing is very important. Timing is the art of having the blooms in prime condition on the day of the show. Blooms which reach their peak before or after the show are fine for garden decoration or to give to friends, but they do not win blue ribbons. In the New York area, planting for exhibition is usually done in late May and early June, and the plants are topped as soon as strong enough. To produce "A" size specimen blooms, two, three, or four canes are allowed to each plant. A second topping is done about ten weeks before the show, allowing a few days between the topping of each branch or cane so that there will be some spread of the blooming period. A final timing is done when the buds form. A bud measuring between one-quarter and three-eighths inches in diameter will develop into a fully mature flower in about four weeks —a little less for cactus varieties and a little more for the massive "A" type decoratives and semi-cactuses. At this time all other buds are removed from each branch, or cane, leaving one bud the size of a small pea. Disbudding is carried down the plant four or five pairs of leaves, or even more if long stems and large blooms are desired.

The "B," or medium-size varieties, usually are not forced with as much

nitrogen or water as the larger, or "A" size varieties, because size is not as important as perfection of bloom. More branches or canes can be allowed. The final topping can be usually done two to three weeks later than for the large varieties. Small varieties, pompoms, and miniatures are branched to produce large bushy plants which are allowed to start blooming a few weeks or so before show time. They are not disbudded until the blooms are picked; this keeps the size down as is necessary, and also gives a larger selection from which to obtain the *matched* blooms to win the blue ribbons in these sections.

Before show time the show schedule should be carefully studied and checked against the blooms as they open. In this way the varieties available for each class can be compared by the intending exhibitor. It is a great waste of time and flowers to cut everything in the garden, bring all the blooms into the show, and then have to discard a large number. Actually, the exhibitor must judge his own flowers in order to select the best to exhibit. The following points are well to remember:

1. Choose flowers that face sideways or slightly up.
2. The stem should be long enough to hold the flower well up out of the foliage but not so long as to be out of proportion.
3. The petals should be "clean" — that is, not bruised or discolored.
4. The flower should be "centered" —that is, not lopsided with the petals falling away from the top of the flower.
5. A deep flower is of higher value than a shallow one.
6. Other things being equal, a large flower should beat a small one; however, a small clean flower will beat a large one which is not in perfect condition.
7. In classes calling for more than one bloom, select for uniformity of size, color, formation, foliage, bloom position, etc., especially where several blooms of one variety are specified.

Dahlia 'Ruth Alampi' with which the author won the American Home Achievement Medal at the New York Show in 1953 for the best new introduction.

The actual cutting of the blooms should be done the evening before the show. Cut with a total stem length of about thirty inches for large and slightly less for medium varieties. Use a sharp knife and make a slanting cut to avoid the thumb. Immediately plunge the stem into water in a vase and carry it into the storage room; place the stem in a large container of water, and again cut the stem — an inch or two higher — making the cut under water. To harden, that is, to prepare the blooms to "stand up" on the exhibition table, the flowers should be kept from four to twelve hours in deep containers of cold water in a cool room free from drafts.

At the conclusion of this "hardening" process, the flowers are ready to be transported to the exhibition. If the number is small, they may be transported in water, provided the containers can be securely fastened in the car or truck to prevent them from shifting or capsizing. Also, the flowers must be carefully supported and tied to prevent snapping of the stems or bruising of the petals by contact with other blooms or the side of the car. If many blooms are to be taken to the show, they should be packed in large sturdy corrugated flower boxes, four or five feet in length, nine or ten inches in depth, and sixteen or eighteen inches in width. The boxes

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'Spotlight', a first-year seedling in 1950 in the author's garden and winner of the "Flower Grower" award at the New York Show in 1952.

PANSIES

ON TRIAL

By **Daniel Dowd**

POPULARITY of horticultural plant groups is subject to the vagaries of fashion. As with other things, a long continued style becomes wearing in time, and interest veers to that which is new or presented in a different light. The interest engendered by enthusiastic members of single plant societies creates an atmosphere for wider appreciation and improvement of their chosen subjects. Thus, in recent years we have seen the rise to stardom of African violets, day-lilies, geraniums, and a host of other genera. Easy hybridization and clonal increase of named varieties are factors affecting newness and availability of named varieties.

The pansy, which has known two hundred years of cultivation, received its greatest recognition in the form of a Viola Conference held in 1895, at the Botanic Gardens, in Birmingham, England. At the time, bedding with herbaceous materials was the vogue in gardening. In fact, it (bedding) was one of the marks of the Victorian era, which for its heaviness in design and lack of originality came to a timely end. Today's gardens present a multiplicity of opportunities for use of pansies. The simplicity of a modern garden calls for some color note to relieve the starkness of paved areas and garden enclosures. Whereas many spring blooming plant materials have a short duration of blooming, the pansy produces color in abundance for at least two months and longer if in cool or semi-shaded locations. Traditional types of cottage gardens and flower borders need the ground effect of pansies to enhance the appearance of the taller bulbs and perennials of spring. While, admittedly, there is nothing radically new among pansy types, there has been a steady improvement of strains and some novelties worthy of note have appeared.

In an attempt to compare and evaluate the many kinds of pansies on the market today, over ninety varieties and strains were grown and studied in the ornamental gardens of Long Island Agricultural and Technical Institute at Farmingdale, New York. Catalog claims and descriptions are often confusing, and only comparative trials of plants can adduce the facts. Seeds were planted in July and as late as August 18. Fifty plants of each variety were planted in a block system. Winter protection with salt hay mulch was applied in January and removed in mid-March. Observations were continued from April until June 21, when the tests were torn out to make way for the All-America Flower Selections. Factors noted were: 1) earliness of bloom; 2) size of flowers; 3) trueness to type; 4) general quality of mixture.

EARLINESS. Market growers are partial to mixtures which respond early and can be easily forced for the basket trade. On the authority of William Sheridan of Vaughan's, it is stated that the top three mixtures in trade volume are the Super Swiss Giants, Maple Leaf Giants, and Amsterdam Giants. In the Farmingdale trials, the earliest to bloom were Amsterdam Giants, America, Ross Selected Giants, Ball Winter Hardy, and Roggli Elite Mixture. Extreme earliness of bloom results in earlier maturing and leggy plants with small flowers in June and is not an advantage as far as home growing is concerned. Later blooming plants are at their prime in early June and continue longer.

SIZE OF FLOWERS. In the parlance of the seed catalogs, all pansies are giants of some degree. The largest flowers were observed among the Maple Leaf Giants, Floradale Giants, Steeles Jumbo Mixture and Oregon Giants. Somewhat smaller were Engleman's Giants and the Swiss Giants.

TRUENESS. Being variable by nature, it is a difficult task for seedsmen to maintain fixed varieties of color. There is a tendency to vary from the type, and constant selection is needed. In this respect, the Roggli Originators' strains were observed to be the purest among the named color varieties.

GENERAL QUALITY. Among mixtures the dark and bronze-toned varieties have the least appeal in mass planting. Although attractive as individuals or as cut flowers, they become obscured out-of-doors. A good market mixture with eye appeal is one with clean contrast of value and a fair variety of hues. Such a mixture is predominantly composed of yellows, whites, blues, and purples in approximately equal pro-

Large-blotch Swiss Giant Mixture.

Maple-leaf giant pansies.

portions with a few other blends. It is aptly termed a *lively* mixture. It appears that mixtures which are blends of separate varieties are better balanced than those composed of random collected seed.

TYPES OF FLOWERS

Early attempts in improvement of the pansy were directed toward the elimination of the honey guides or the pencilled lines common to the wild prototype, *Viola tricolor*. In various degrees this has been accomplished:

1. Small blotches — Most mixtures have small dark blotches in the center of the petals which create the familiar faces.
2. Large blotches — The Swiss and Geneva Giants have the dark blotches extended over most of the petals with a marginal band of lighter pigmentation.
3. Selfs — Flowers devoid of any markings were developed over fifty years ago, the first being a white variety named 'Violetta.' Separate colors are effective for mass effects and increasing in popularity.

Judged on the above mentioned traits, the following varieties made the best showing in the Farmingdale trials.

Small Blotch Mixtures

Vaughan's America. A good lively mixture, early in bloom, enduring well into June.

Breck's Boston Prize Mixture. Predominantly light colors, reaches an early peak.

American Bulb Company's Mixture. A Good Giant Trimardean type, enduring well into June.

Vaughan's Amsterdam Giants. Early bloom, light colors predominate.

Burpee Floradale Giants. Extra large flowers, lively colors.

Engleman's Giants — Ball's extra large-flowered mixture. A good basket mixture.

Vaughan's-Ross Bros. Selected Giant Mixture. Early blooming, well-balanced mixture.

Large Blotch Mixture

Roggli Originators' Strain. Elite Mixture. A well-balanced mixture of Roggli-named varieties of Swiss Giants.

Ball Swiss Giant—'Color Carnival.' Extra large blotches and unusual color blends.

Ball Super Swiss Giant — Special Mixture. A good dwarf Swiss; compact plants.

Burpee Blend — Giant Fancy. A good Swiss Giant Mixture.

Straight Colors

Purple: 'Madame Steele', large-flowered with a face.

Blue: 'Thunersee', the same as 'Lake of Thun' or 'Ullswater.' An intensely dark blue with large black blotch.

Vaughan's 'Early Blue Boy,' a medium blue self, fading lightly to edges.

'Delft Blue', a popular pale blue with a distinct face.

White: 'Paper White', an exceptionally clean white.

'Moon Moth', a creamy white, largest of the whites.

Yellow: 'Eiger' (Yellow Swiss Giant), large blotch, large flower.

'Rheingold', black-blotched, slightly smaller than 'Eiger.'

'Coronation Gold,' deep yellow self, large flower.

'Pay Dirt,' deep yellow self, large flower.

'Yellow Forerunner,' an extra early self on the order of 'Coronation Gold;' some variability with slight ray markings.

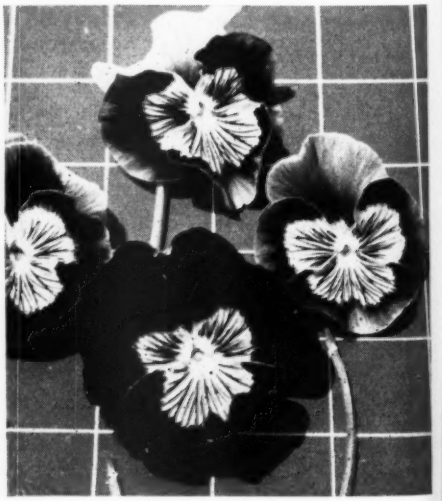
Brick-Red or Orange: 'Hohenfeuer' or 'Firebeacon,' — Roggli Originators' is best.

'Giant Orange', a large flower, deep apricot self, maintaining size and quality into late June.

'Alpengluhn'—Roggli Originators' strain. A mahogany-red with large blotch better than domestic 'Alpenglow.' These varieties all tend to vary considerably.

'Ball Redskin', a blotched red on the order of 'Alpenglow' but deeper in tone. Best in bright sunlight.

Pansy Felix Strain.



'Blumlisalp' or 'Raspberry Rose,' a distinctive colored Swiss Giant, somewhat variable.

'Jet Black', a velvety black novelty; the flower tends to be small. Not impressive in the garden, but contrasts well with white or light yellow.

NOVELTIES

Benary's Early Orchid Flowering Giants are pastel-colored and delicately-toned flowers of medium size. The flowers are ruffled.

Masterpiece Ruffled are the most ruffled of any but, as a result, the flowers are quite small.

Felix, an interesting large-flowered cut-faced strain. In this mixture, the center is yellow and marked with conspicuous, pencilled honey guides. The broad outer margins are most attractive when of a dark contrasting color. About sixty percent of those in the trials at Farmingdale had smoky yellow margins and were less attractive.

'Beaconsfield,' a standard purple bicolor, has lavender top and dark purple bottom providing a pleasing contrast.

BUY GOOD SEED

Success with pansies stems from the use of good seed. Seed may vary from fifty cents to twenty-five dollars per ounce, but when one realizes that there are twenty thousand seeds per ounce, the premium cost is negligible. Reputable seedsmen replace their stock frequently, since pansy seeds retain their viability for only eighteen months. Old seeds will not sprout.

RAISING PANSIES FROM SEED

Seeds are sown from mid-July to August and produce plants which are large enough to endure the winter. Bear in mind that pansies like coolness. Keep the seeds constantly moist and preferably in the shade until germination occurs. *Fresh* seed should sprout within six to ten days if conditions are right. Barely cover the seed. Burying the seed more than one sixteenth of an inch may prevent growth. A soil mixture that is made light with sand and peatmoss will not cake but will hold moisture. Coldframes should be covered with lath or cloth to protect against heat. The sides should be open for ventilation, however. Sowing in flats permits starting in a cool shady spot and then moving into more light after sprouting.

When plants are large enough, they may be pricked off into flats or planted directly into the growing beds. Spacing at eight-inch intervals allows ample room for growing and cultivation, but plants may be spaced closer if desired. The secret to large flowers is to grow plants with large root systems. Deep roots can reach reserves of water and nutrients. A soil mixture containing twenty-five percent leafmold will produce amazing results. Plants with large root systems will transplant better and show little or no setback. Pansies do best in soils which are circumneutral, and the addition of ground limestone at the rate of five pounds per hundred square feet is suggested. Before planting, be sure that the soil is well irrigated in advance because dry peatmoss is slow to take on moisture.

Pansies should be just about ready to start flowering when cold weather sets in. Quite often they winter on Long Island without protection. Alternating freezes cause heaving and exposure of roots to drying wind, so some light protection is advisable for the winter. Salt hay, light straw, loose oak leaves, and even excelsior can be placed around and lightly over the plants. Market growers often use open frames and place sash over them in March to insure earlier blooming.

The home owner can perpetuate particularly choice varieties by cutting back the top in the end of June. This diverts the energies of the plant from seed to production of new growth and flowers for September. Pansies planted in partial shade escape extreme heat and will continue to bloom all summer, if old flowers are kept picked. Another method of propagation used for unique plants is to take cuttings or to divide old clumps. In either case the stem should be separated at the crown so that a small amount of root tissue is taken also. Cuttings placed in a good growing medium, watered and shaded, should make strong plants.

In choosing pansy varieties now, think of favorable combinations of color with your tulips or study the effects that solid masses of one color might achieve in your garden. The wide range of colors available will permit a selection which will fit any situation you have.

JOHN HENDLEY BARNHART: AN APPRECIATION

By H. W. Rickett

SOME MEN ACHIEVE greatness almost unobserved. Their lives are passed in a quiet pursuit of knowledge, with none of the fanfare of honors, the rewards or the eminence enjoyed by their better-known colleagues. Yet the service which they render may spread in widening circles until it touches many who scarcely know their names.

John Hendley Barnhart was for nearly forty years—through most of its existence — an active member of the staff of The New York Botanical Garden: first as Editorial Assistant, later as Librarian, finally as Bibliographer. For several years after his retirement as Bibliographer Emeritus, he was still to be found almost daily at his desk. His successor now sits in the part of the library colloquially known as the Barnhart Room, surrounded by hundreds of rare books and sets of periodicals acquired in the tireless searching of the former occupant, by shelves laden with the reference works which were the tools of his craft, by a vast apparatus of bibliographical and biographical card indexes built up through his years; even the office furniture was his.

All these things represent the material environment, the shell, as it were, of a life of scholarship. From his desk in their midst Barnhart carried on a worldwide correspondence with botanists, eliciting information about their travels and collections, about other botanists and their works, answering questions about botanists, about botanical nomenclature, about botanical books and their authors, about botanical institutions and periodicals and collections and travels, about Latin and Greek stems and roots for new botanical names, about Latin declensions and conjugations for formal diagnoses of genera and species, about difficult passages in half a dozen modern languages, about printing and printers' marks — about a vast miscellany of things which botanists (especially taxonomists) often

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Weather Effects on Tree Growth

By August P. Beilmann

Garden owners will find the information in this article, based on a talk before the Midwestern Shade Tree Conference, St. Louis, Missouri, February 1955, of real value. It will help them to understand the intimate relationship of trees and weather, and how their trees react to certain conditions.—The Editor.

JUST TWENTY YEARS ago I had the pleasure of presenting before the National Shade Tree Conference a paper entitled, "The Role of Instruments in Tree Diagnosis." At that time it was pointed out that we needed better diagnostic procedures. In the intervening years we have done little except in the fields of pathology and entomology, where we have developed control measures that are quite universally followed. In so far as physiology is concerned, our diagnostic procedures remain just about what they were a long while back.

But if a man remains in the field of tree care for some years he will have seen so much of our "midwest" weather that he will have developed some caution and formulated some rules, and these might nearly serve his purpose. We cannot, however, depend entirely upon occasional observations, even though they stretch over two or more decades. We must learn much more about the environment and how it affects trees; we must know and understand the intimate relationship of plants and "weather."

To most people a living tree shows only limited evidence of being alive! It does certain things in certain seasons but many of its activities are almost unknown. To them a tree is either unfolding leaf buds, or the season has progressed so far that the tree is preparing for fall by shedding its leaves. And this is the extent and degree of its being alive! But all woody plants are much more alive than this, and if we can recognize their needs, their limitations, and the mechanics of their adaptability, we may be more successful in our operations. We need to know these things to transplant successfully, to match a species to a particular site. Such knowledge is the basis of our effort to keep a tree alive. We might even extend the life of a tree that is growing in the wrong situation.

Let's see something of the mechanics by which a tree can safeguard itself from the uncertainties of a midwestern spell of weather. Nearly all of our trees complete their diameter growth early in spring, April 10 to June 18, when a surplus of water is available. Actually they require about ten weeks to complete the growth of the season. In the process they lose water during the day and absorb more during the night. As long as the intake at night exceeds the loss of the preceding day, the tree is behaving normally. But as the midwestern spring turns to summer and the rains become infrequent, the tree may actually lose water and shrink. If this continues for any length of time, the tree will be in danger. To guard against excessive losses the stoma on the leaves may remain closed, the leaves folded to avoid maximum exposure, and as a last resort the tree may shed a large percentage of its foliage. You recall that the textbooks say that a mature tree uses hundreds of barrels of water a year. In our area, during 1954, no hilltop tree had even a single barrel of water. Some of them died but many lived.

Water moves upward in a tree trunk as a microscopic strand through only a few of the outer, or youngest, annual rings. The process might be described as somewhat like pulling very fine threads through a series of sieves, cutting off the tops and then pulling more through. If the strands are broken, air bubbles enter the tracheids and that strand remains out of service. This can happen in winter as well as in summer. In fact, this is how heartwood is formed. If too many strands are broken because dessication has proceeded too far, a tree may not be able to absorb additional water even though it is made available.

Both sunshine and wind are part of our "weather," and both can limit tree growth. Few of our trees do their best under a cloudless sky, most of them do best when the sunshine is much less than the maximum. Only desert plants can withstand maximum sunshine day after day — and these plants have leaves of a different sort than those of our trees. If you use recording instruments of sufficient delicacy, you can see the record of each passing cloud in summer. While in the shade of the cloud, the evaporation loss is momentarily checked — an oak tree would grow better if each summer day was partly cloudy! The brilliance of the sunshine in spring and again in fall is not so important; in those seasons the nights are as long or longer than the sunlight hours and a certain amount of sunlight is needed to carry on photosynthesis. The damage occurs in midsummer when the daylight may exceed the dark hours and a tree may be exposed to full sunlight in an atmosphere almost devoid of moisture. During such portions of the year, all trees shrink a little in diameter. This is perfectly normal as long as an opportunity for recovery exists; but if the shrinkage is continuous day after day with little recovery at night, then our most hardy native species begin to show distress.

Even a small increase in the velocity of the wind can check growth by increasing evaporation. Some years ago, to learn a little more about this, I set up a seven-foot airplane propellor powered by a suitable engine and designed to blow directly across a tree. In this region the normal wind movement is about nine miles per hour throughout the summer season. But in this experiment I used an artificial breeze of seventeen and a half miles per hour and discovered that our native trees cannot stand this additional exposure. The machine was operated during the daylight hours and only for six hours daily, but at the end of six days the half of the tree facing the wind had ceased to behave as a normal tree. Growth had stopped and there was no recovery during the night. It might be interesting to add that the artificial breeze was not strong enough to pin the branches down—rather they swayed back and forth just as would happen during a storm. The half of the tree not facing the machine continued to be-

have normally — it lost moisture during the day but recovered at night.

The sunshine and the wind add up to what we might call "exposure." Every tree we grow has a capacity to tolerate just so much of either one; if that capacity is exceeded a tree will not grow well and it will take much more than food and water to keep it alive.

Temperature certainly has an effect on plant growth; but the temperature is but a reflection of all the things that go to make up the "weather." First of all, let's examine the soil temperatures; they do not fluctuate so widely. Rather they rise through the spring and summer, decline somewhat as the days grow shorter, but rarely drop below 56° F., until winter is well under way. This is rather important in our planting program. The roots of most woody plants can make active growth only within rather narrow temperature ranges. They grow but slightly when the soil temperature is below 50° F., and virtually all growth is completed when the temperature rises above 66° F.

In our immediate area (St. Louis, Missouri) the soil temperature remains high enough for new root growth well into December. This means that a newly-planted tree has many weeks to become established partially, if all other conditions are favorable. For this reason we prefer fall as a planting time. In spring the soil warms up slowly; sometimes leaf development is well under way, before the soil is warm enough to permit root growth. If winter suddenly changes to summer — as it often does with us — then a newly-planted tree finds itself in the uncomfortable position of requiring much water but lacking the roots with which to supply it. We might think of the soil temperature as a smoothed curve of the air temperature but reaching the maximum and the minimum a week or even several weeks after the peak of summer heat or the deepest cold of winter. This pattern of soil temperatures will be similar for all the territory in which you operate. The dates will change and the season shorten as one goes north. In the south the optimum soil temperatures for root growth may be much lengthened. You might, however, give serious thought to mulching as a means of minimizing extremes of soil temperatures.

The air temperature is quite another matter. High temperature can check growth by accelerating transpiration, and it can cause injury or even death. But rarely do we have just "temperature" alone; all the other phenomena that go to make up "weather" are always part of this measurable feature. We do not experience new records in summer, unless we also have a brilliant sun and perhaps low humidity — and often a stiff breeze. Usually a reverse combination of all these things gives us a new low in the winter. So while we can measure air temperatures, we seldom can separate its effect from the other contributing factors. On the other hand, extraordinary temperature, either high or low, when superimposed on all the other features of weather usually means injury to plants.

However, trees respond to temperatures very definitely. For instance, buds open in spring after an accumulation of a certain number of hours of mild temperature — something like the "degree day" used in estimating fuel requirements, and quite like the present method of planning cannery operation. Here the ripening dates are calculated on the temperature and the hours above and below an optimum for the plants grown for processing. Just how many hours a soft maple or elm must be exposed to 50° F. temperature before the buds open is not known. But certainly it is much less than the accumulated heat needed to open the buds of either oak or walnut. Last year, for the first time in my nearly forty years of observation, the oaks and walnuts opened flower buds too early and they were frozen. Normally, they require so many more hours of exposure to warm weather that they safely escape the late and unseasonable freezes! The native plants are well adapted to the weather, and any introduced plant must be equally adaptable or must have the same requirements. From this you can see that a plant must be carefully geared to air temperatures or it may be seriously injured, and this may happen without superficial evidence. I have in mind the willow oak *(Quercus phellos)* of the south and the sweet-gum *(Liquidambar styraciflua)*, both of which may start very slowly in spring. In both cases, there seems to be a great deal of damage to cambial initials below the buds; while it is seldom serious enough to kill the tree, it does take weeks sometimes before the damage is repaired and the tree returns to normal growth. In 1929 we lost many of our mulberries *(Morus rubra)* because of low temperature injury to cambial initials all down the trunks.

Although air temperature is often only a manifestation of weather in general, it can and does limit our choice of plants for a particular spot. For instance, we would need to be most careful in choosing plants for a courtyard, or an ell between buildings, where temperatures might build up on a brilliant day. Likewise, the plants used on the north side of a tall building must be chosen with the knowledge that here somewhat lower temperatures will always prevail.

Since trees are very sensitive to all the things that go to make up our weather, it follows that we should find ways and means of overcoming those extremes which do the harm. We might even be able to keep a plant alive, although it may have been a very poor choice for that site. If we go back to rainfall and moisture, since these are factors we can control in part, at least we can irrigate if it doesn't rain! No doubt we all learned during the past two years that many woody plants can do quite well with less than the usual rainfall. We have just seen that water is a vehicle transporting salts and elaborated food within the tree. We have also seen that trees can be extravagant if sufficient water is available and that they can be most miserly when the supply is short. It follows then that it is not the amount of water available but rather the concentration of raw food in that water. Here, again, we have some control — by adding fertility, a given plant will need far less water to make a satisfactory growth. Beyond this we can, through the use of mulches, stretch out a meagre supply. If the moisture supplied by rain is made uniformly available by mulches, we shall have done much to overcome drought, cloudless skies, and generally high temperatures.

We cannot easily overcome the effects of too much wind, nor can we grow trees that enjoy partial shade in a very exposed situation and hope by some alchemy to make them enjoy uninterrupted sunshine. For these cases there is no ready answer — and it is these trees that so often become a target for every vagrant bug and unclassified disease.

GARDEN WORK

FALL TO SPRING

By James M. Gibb

AFTER THE FIRST killing frost has visited the garden, many an amateur feels that little remains to be done beyond the usual cleaning-up tasks. If he is the careful type of person, his tools will be cleaned, oiled, and hung up in their allotted places and following this he may devote spare time to the social activities of the winter season.

A successful garden is not, however, created overnight nor in the springtime. It is generally the results of plans and efforts to equal or surpass the previous season's performance. Reaching this goal requires action rather than resting on one's laurels during the autumn and winter months.

The annuals killed by the first hard frost leave open spaces in borders and beds close to the house. These areas may be brought to life again and the flowering season extended about four weeks, if some hardy chrysanthemums are available for transplanting. The plants can be grown in a line in the vegetable or cut-flower garden and moved even when in full bloom. They should be planted a couple of inches deeper and given plenty of water to prevent wilt. The low-growing varieties are best.

After the freeze, remove all the annuals from the beds and perennial borders, then cut back the perennials to about two inches above ground level. Clean out all the weeds, fork lightly, and then the beds will be ready for planting tulip bulbs for a spring display. Tulips can be planted any time before the ground is frozen. A few years ago it was common practice to plant tulips as late as possible to prevent mice from eating the bulbs, but now they may be planted early — provided the bulbs are dusted with "Pestex" or an equivalent. This safeguards the bulbs for one year. Myosotis or violas make a very pleasing ground-cover under tulips; if so used, they should be planted before the bulbs, which otherwise might be damaged.

Do not overlook the beautiful spring displays that can be had from other fall-planted bulbs. Narcissi and many other small bulbs may be planted in shrubbery beds, under lilacs, dogwoods, or fruit trees and in grassy areas which are not cut by the lawn mower. A good selection of suitable bulbs will be found in the fall bulb catalogs. When planting bulbs for a natural effect, avoid stiff groups by taking handfuls of bulbs and throwing or broadcasting them. Then plant the bulbs in the spots where they have fallen. Good narcissi mixtures will furnish a five to six-week period of bloom.

Falling leaves can become a problem at this time, but not if they are cleaned up regularly and turned into a compost pile. Annuals, perennial tops, and even weeds may be incorporated in the compost pile, provided there is no borer infestation or evidence of fungus diseases. Leaves alone, if piled in a shaded spot for eighteen months, will provide good compost for the flower or the vegetable garden. Keep the top of the pile flat or slightly concave to catch as much rain and snow as possible. Moisture is required to start the decaying process. Turning the pile over two or three times will help the decaying process after the first six months.

As the winter approaches, steps have to be taken to protect the hybrid tea roses — and the procedure is the same for a complete rose garden or a few choice plants. First hill them up with soil around them to a height of about ten inches. If the roses are widely spaced, the soil around them can be used; if closely spaced, it is better to bring in soil, about three shovelfuls for each plant. The plants are left this way until the ground is frozen hard. usually early in December around New York City; then a good covering of salt hay, oak leaves or, best of all, cow manure is applied. This covering keeps the frost in — frozen ground is good protection against mice feeding on the stems.

Boxwood should be covered at this time and any other winter protection, such as covering perennial borders with salt hay, should be completed.

After your winter covering is finished, it is not too early to think about Christmas decorations. These can be made with greens taken from evergreens around the house and garden, especially if there was no cutting back done during the summer. Cut off small pieces here and there with the pruning shears, keeping in mind that the cutting-back operation should leave a natural-looking evergreen. Making the decorations is a subject by itself, and we leave it with the suggestion that much can be learned by attending the fine Christmas greens shows of some of the garden clubs.

The weather more or less determines what can be done around the garden in January and February. This is, by the way, the usual time to look over the new seed catalogs.

If the weather is pleasant, fruit trees can be pruned. Pruning should not be confused with cutting back, which is a much more drastic treatment. Starting with apples and pear trees, remove all sucker growths — a saw is much better for this than the pruning shears as it will give a closer cut. Then cut out branches which cross others and branches which are too close together. It is easier to spray and pick fruit from low-growing trees so keep the trees as low as possible. When trees have been allowed to grow too high, they should be cut back — but not too much in any one year, otherwise large limbs will be damaged by sun scalding. Peaches do not require much pruning. Look them over carefully and remove all dead wood, also branches that are growing too close together.

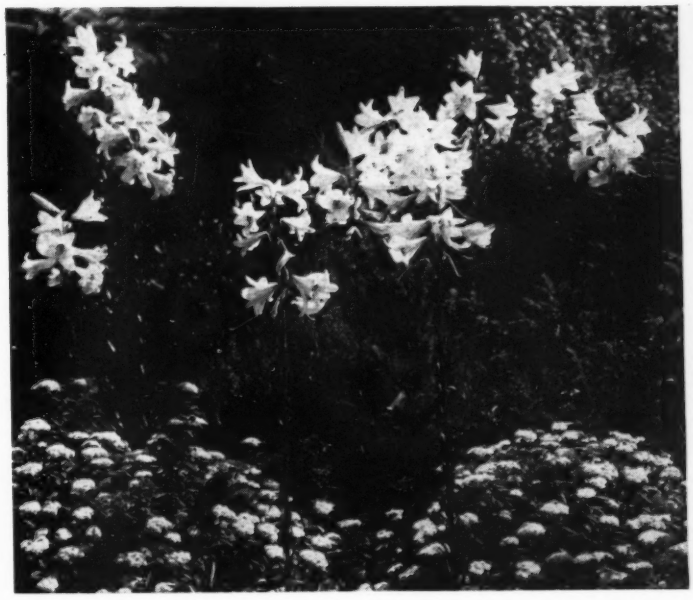
Remove dead wood on the lilacs, also any seed pods which were not cut off last summer. Seed pod removal at this time is just a chore, but it will greatly improve the appearance of your lilacs. Spring-flowering shrubs are normally pruned in early summer; but if passed by then, it can be done early in March provided the flowering habits are taken into account. It is always advisable to cut out some old wood, if there is enough young wood to take its place. Avoid the kind of pruning and cutting back which gives a straight-across-the-top appearance to shrubs. In most cases, properly pruned shrubs retain a natural shape and blend into

(Continued on page 158)

NOTES ON:

THE USE OF HARDY BULBS

By Howard Swift



Lilies put on a spectacular show in midsummer.

Early Color In A Foundation Planting

There is no sudden emergence of spring after winter. We look for the first sign of life on growing things in the garden long before winter gives up its dominant role to spring. There may still be snow on the ground when the first bundle of leaves thrusts its way through stiff, cold earth — arising from early bulbs. And isn't it particularly satisfying to discover this early manifestation of new life close to the house — perhaps near the doorstep or by the walk leading from the drive?

A foundation planting can have some early spring color without losing the appropriate dignity of a public area. But what develops after the first leaves emerge should be low, modest, and unobtrusive. Some of the smaller bulbs flowering when the garden is quite barren can be a very happy addition to the foundation planting. They should be well chosen and set in small, natural communities — never in straight rows. To be most effective, the bulb planting should extend back under the shrubs to avoid a fringy appearance. With discretion, winter aconite *(Eranthis hyemalis)*, snowdrop *(Galanthus nivalis)*, crocus, glory-of-the-snow *(Chiondoxa)* and grape-hyacinth *(Muscari)* may be used. This is not the place for a collection, however, and should include not more than one, two or three different kinds of bulbs which will complement the permanent material.

Even if a groundcover extends beyond the taller permanent planting, lesser bulbs can still be used for early color here and there. But how shocking to see tall flowers of any kind standing in rows like guards in front of a good selection of shrubs near the foundation of a building!

Fanfare for A Mixed Border

Even at that time of year when a perennial or mixed border is primarily a promise for weeks ahead, a fanfare of color in flowering bulbs certainly makes the heart beat faster in sheer joy. The early bulbs precede all the border perennials — even leopardbane *(Doronicum)* and bleeding-heart *(Dicentra spectabilis)*. In the foreground, broad spaces may be planted with glory-of-the-snow *(Chionodoxa)*, scilla *(Scilla biflora* and *sibirica)*, snowdrop *(Galanthus)* and *Tulipa Kaufmanniana* — the first of the tulips and one of the most spectacular even though the stems are not long. Following in succession, not all relegated to foreground planting but carrying the color sequence back into the border, is a more extensive series of flowering bulbs. The most important groups in this lot are the large-cupped and short-cupped daffodils which inspire an endless number of attractive combinations. Year after year new colors and new combinations of colors as well as new forms are being added to those represented in an already long list of fine varieties. A very comprehensive evaluation of daffodils is offered by the Royal Horticultural Society's "Classified List of Daffodil Names" and may help you to secure the very best. *Iris reticulata* is another bulbous subject to consider. Its rich, purple color with bits of yellow on the falls always stimulates border interest. The snowflake *(Leucojum vernum)* whose nodding white flowers are flecked on the petal tips with a bit of green, is another. Its stems are about a foot high. Then come the trumpet daffodils — a vast array of them — and the jonquillas which are more modest, and the species tulips, *Tulipa biflora* and *T. pulchella.*

After this fanfare, perennials become more important. The bulbs chosen for later flowering, such as the Cottage type, the peony- and lily-flowering and that great parade of May-flowering tulips, may be considered mainly as companion plants for perennials.

The Big Leads

Throughout the garden year, there are flowering bulbs which take center stage when they reach their glory. These should be given a place where stealing the show will not be objectionable—where dominant form and color will give strength to garden design. That regal monarch, the Red Emperor tulip, is often the first to take the stage — demanding attention deserving the sudden appearance of an unexpected cardinal in full regalia. Then come the May-flowering tulips — and what a galaxy! There is such a wealth of color that anyone can find varieties which have personal appeal and best suit the color scheme of his own garden. Some of the most dominant colors available

in garden flowers are to be found in the tulips which flower in May — as well as some quiet tones and some subtle combinations. In evaluating varieties in the May-flowering tulips, distress should not be caused when it becomes difficult to identify a Breeder, Cottage or Darwin by its form and color. As a result of hybridization, identity of tulips as to type often poses a problem even for an expert. It is for this reason that the principal May-flowering types are usually listed together. A breakdown may or may not be included in the description of a variety. Outside this list are the fantastic Parrot tulips, the peony-flowered tulips (double Cottage) and the lily-flowering, which also bloom in May. The Parrot tulips are grown as a novelty, to add unusual interest to a mixed company of the slick tulips, but good specimens are worthwhile. Available colors include—besides lush pink and white—a blend of blue and purple, a deep orange, a golden-yellow, and one so foreboding that it is called Black Parrot!

Peony-flowered tulips are short and buxom—ideally used in a bed by themselves where there is dappled shade to help preserve their colors and delay their shattering. In a mixed border they always seem too heavy for their low stature — perhaps because there are often few taller things in the immediate vicinity. Sometimes they can be used effectively as an edging for formal beds of taller-growing tulips, but for such a bed varieties which flower simultaneously must obviously be selected.

The lily-flowering tulips have a sprightly charm and lightness which is most appealing. Just picture a border with only pink and white tulips of this type, frequent clumps of bleeding-heart, and an underplanting of pale blue forget-me-nots. Imagine large groups of yellow lily-flowering tulips beneath a flowering cherry and above a carpet of perennial candytuft!

May is an exciting month in the garden. It takes a really flamboyant entrance to win a flutter of applause. The brilliant red crown imperial *(Fritillaria imperialis)* will accomplish just this if it can be grown to perfection. A sunny, sheltered spot, furnished with a good leafy early spring background, is an accepted requisite.

A mighty giant follows the madonna lilies: the foxtail lily *(Eremurus)*. It has an inflorescence which may be three feet long beyond the bare part of its stem — also often three feet in length. Its pastel colors blend well with other garden flowers, but height limits its use to borders of fair size where it will not be out of proportion. A noted San Francisco flower shop features it in season as a cut flower, arranged in large bowls — something to remember, I assure you.

Midsummer big leads include the gold-banded lily *(Lilium auratum)*, which may bear six to twelve flowers eight inches across on three-foot stems; *Lilium superbum* whose stems may grow eight to ten feet and display twenty to thirty magnificent flowers; the regal lily *(Lilium regale)* which carries long white trumpets, pink on the outside, clustered at the top of four- to six-foot stems.

There are many other lilies which make their entrances, put on a spectacular show and exit all too soon. Only by careful consideration of color, form, and growth habits of the hardy lilies, can you decide which ones to order.

An underplanting of arabis is an effective foil for tulips.

Companions for Flowering Shrubs

Whether you use shrubs as a background for a mixed border in which bulbs are featured, or as immediate background for groups of bulbs by themselves, thought should be given to possible combinations. Consider for April *Cornus mas* or *Hamamelis japonica* flowering above drifts of lavender and yellow crocuses; forsythia bending gracefully over hundreds of chionodoxas; *Pieris floribunda* with its upright flower clusters behind groups of blue scillas. In May, imagine the fleet-

A garden path, enchanting in spring with daffodils and primroses.

ing beauty of amalanchiers and dainty yellow trout-lilies *(Erythronium)*; pink *Rhododendron nudiflora* with *Iris cristata;* a double-flowering almond above naturalized poets' narcissus; the Breeder tulip 'Kathryn Truxton' or Cottage tulip 'Queen of Spain' beneath branches of *Enkianthus campanulatus,* hung thickly with little creamy yellow bells striped narrowly with red. A ground-cover of *Alyssum saxatile* var. *citrinum* might even be added to such a combination. The imagination can conjure up many delightful associations of bulbs as companions for flowering shrubs. Knowing the normal flowering dates is, of course, imperative.

Strictly Formal

Uniform flowering is the ideal in a formal design. Although flowers at two or more heights are desired, it is important to have each group bearing flowers literally on a level. For this purpose, what better choice than properly-selected hyacinths or tulips? These bulbs as they flower are individually quite formal and are ideal because of that. In hyacinths, the stalwart, erect, full-flowering kinds often listed as "exhibition" or just "large" are best. They are grown under highly specialized conditions and the bulbs are usually graded to exclude bulbs measuring less than 18 cm. In these large bulbs there is a more substantial quantity of food than in smaller ones. They generally reward the grower with larger flowers on stronger stems.

Because our garden conditions are not ideal, a second season's display, equally successful, cannot be expected. It is best to pass these bulbs on to another section of the garden and to place a new bulb order for next year's formal planting. French Roman hyacinths are indvidually too casual in appearance for formal beddings.

For tulips, single early, double early, peony-flowered, Breeder, Cottage, Darwin, and Rembrandt types are well-suited for formal beds and are available in a wide range of colors. Varieties should generally be of one type —special attention being given to height and flower form. In the taller tulips, the chunky, broad-based flowers do not go too well with varieties which, before fully open, are long and slim. If the varieties are of two types, then it is important to know that the two selected will flower at the same time.

When planting bulbs in formal beds, all the soil should be removed to an inch or two below planting level — usually six to eight inches for tulips and five to six inches for hyacinths. The under soil is then carefully prepared to a depth of eighteen to twenty inches downward from this level. Well-rotted cow manure or some substitute organic matter is incorporated, and commercial fertilizer such as 5-10-5 (four pounds per square foot) added. Fill in an inch or two of soil without manure just below bulb level. A layer of sand may be spread for the bulbs to rest upon — this is not, however, essential where there is adequate drainage.

Bulbs for Unsophisticated Roles

Many home properties have an area which calls for very informal treatment or even the development of a wild garden where many native plants can be made to feel at home. In such a place there are several kinds of bulbs which may be employed to play unsophisticated roles — adding immeasurably to one's garden pleasure. A list would include the lovely lily-of-the-valley *(Convallaria)* which thrives in dense shade and with little attention; dainty fritillarias — some with a faint checkerboard design in the petals of their pendant flowers; narcissi effectively strewn across a grassy hillside or stream-bank; crocuses so well naturalized under a giant tree; scillas and camassias in a shaded glen; trout-lilies under a dogwood or beside a grey boulder. Any of these bulbs require but little care and soon establish themselves, looking as though they belonged in this natural kind of setting.

The Extras

What about those tulips and hyacinths demoted from formal beds, and daffodils which are possessed in abundance when plantings are broken up

and replanted? These can be planted advantageously in an area set aside for cut flowers, at the end of a vegetable plot or perhaps behind the garage. When flower arrangements are in order for indoors, flowers from these bulbs will be most welcome. In fact, because of their smaller flowers, they may be even more useful than the first-year crop. To keep these bulbs company, plant rows of selected bulbs in varieties which supplement your interior decor—colors which may not at all fit in with the color scheme of your garden. Plant also bulbs from which stems cannot be spared from the flower borders. These are your extras — last but by no means least of the bulbs in your garden.

GARDEN WORK (from page 154)

the landscape in a smooth quiet manner.

Climbing roses can be pruned early in March. Remove all winter-killed wood. Some climbers flower on the same wood year after year, as they do not produce much new wood. This type can be pruned back to two or three buds on the old flowering wood, approximately three-quarters of an inch from the main stem. With climbers that produce plenty of new wood, the old flowering wood can be cut out and the new wood tied in place.

About March 15 it will be time to remove the salt hay or whatever was used as a covering on the hybrid tea roses. The hilled-up soil is left until the end of the month, and pruning should be done soon after its removal. Hybrid tea roses may be pruned high or low. In recent years much has been written about the advantages of high pruning, provided the wood was not killed back to a point where the lower pruning style becomes a necessity. High pruning provides more flowers, but the appearance of your rose garden may not be improved. Lower pruning should provide sufficient flowers to create a display, and they will be at a suitable height for viewing as one walks through the garden. Prune from nine to twelve inches above the ground and just above buds which are facing out from the center of the bush. All weak growth should be removed.

With the end of the rose pruning, we have definitely completed our fall and winter tasks. The work which follows is usually classified under the heading of spring, although it is often intimately connected with the results of our fall and winter labors.

CHRYSANTHEMUMS (from page 145)

would control cables. If cables are not long enough to give required heat, additional cables can be suspended, if outlet wiring is large enough to carry the load.

Our own experiments with heating cables have been quite satisfactory, but we need several seasons more of study to determine the effective minimum heat requirements per square foot area.

DAHLIAS (from page 148)

should be lined with waxed paper and a "pillow" of the same paper (crumpled) should be placed under the back of each bloom. Avoid contact of the petals with other flowers, foliage, or stems. Start packing at each end of the box and work towards the middle. The blooms placed last in the box will weigh down the stems of those placed first and there will be little shifting. However, if rough handling is anticipated, the stems should be tied to the floor of the box.

At the exhibition hall, set-up space must be obtained. The wise exhibitor gets to the show early and avoids congestion. Locate enough containers and fill them with water. Remove the flowers as soon as possible from the boxes, cut the stems again under water, and place them in the containers. The final selection of the flowers is now made; and each flower, so selected, is individually groomed before being placed on the show table. This may be done as follows:

1. Cut each stem to such length that the bottom pair of leaves comes at the level of the top of the container. The stem may be supported at the desired position in the container by stuffing waxed paper at the neck or top of the container.
2. Inspect the flower itself closely. Any petals out of place are gently replaced. A little bruising of the front petals may be carefully trimmed with a sharp pair of manicure scissors, but a badly bruised flower is to be discarded.
3. Select the proper entry card, write the names of variety and exhibitor on the card, and then carefully carry the exhibit to the proper place on the exhibition table as indicated in the show schedule and classification list. Place the exhibit on the table so as to avoid contact with other entries.

From this point on, the fate of the entry is in the hands of the judges. If the other fellow wins, he must indeed have a very fine entry. If you have any questions, check with the judges who are always glad to explain their decisions, and you may receive pointers which will help the next time. The dahlia exhibition is also the time to check the winning varieties, making notes for use next year.

There is no "trick" to substitute for continual — and loving — attention to the dahlia when growing it for exhibition. The best results are obtained by

The low rock wall is a nice setting for these double tulips.

living with the plants from day to day and catering to their needs as they develop. Each variety may be called an individual, and it may take several years of growing it in the garden to learn its likes and dislikes. Many varieties like special attention to produce blooms of exhibition perfection — and the intending exhibitor seeks to discover what this special attention is. That is what makes growing dahlias for exhibition such a challenge.

GARDEN HOUSEKEEPING (from page 146)

quarter bale per one hundred square feet is an alternative procedure.

Fertilizers

If peatmoss, sawdust or similar organic matter is added to garden soil, a liberal application of fertilizer should be made at the same time. Soil improvement practices of this type in autumn should not interfere with plant growth the following spring. Forty pounds of 5-10-5 per one thousand square feet or four pounds per one hundred square feet would not be excessive, if applied both in fall and again in spring at planting time.

Lawn Renovation

Lawn problems come to a head in autumn with the appearance of mature crabgrass. Many gardeners try to dig out the plants of crabgrass or to take up the seed heads. To a minor degree these activities are helpful. Lawn renovation is more likely to be effective. The heavy shade of a good stand of lawn grasses kills out young crabgrass plants in June so that few survive to be troublesome in autumn. Certainly on loamy soils killing broad-leaf weeds with 2,4-D and using plenty of fertilizer are a good start in lawn renovation and can be undertaken in the fall. Instructions for the use of 2,4-D usually are printed on the commercial container and should be followed. Early fall applications are preferable and should be followed in September or early October with a 5-10-5 or an equivalent fertilizer at the rate of forty pounds for each thousand square feet of lawn surface. Fertilizer distributing equipment can be purchased or rented and provides a simple and effective method for distributing the fertilizer. Fall rains are usually adequate to encourage good growth of grass. A repeat application of fertilizer in the early spring (March) will help to stimulate further growth of existing grass.

Mowing should be revised by raising the bed knife of the lawn mower so that blades of grass at least an inch in height are left standing uncut after mowing. Crabgrass seed germinates in the first few days of 80° F., usually June weather, and the seedlings are often killed by shading them out with the taller grass left after appropriate cutting. As rainfall slackens off, mowing can be correspondingly reduced and the grass maintained on the long side. Timely use of potassium cyanate or other crabgrass killer is a second helpful step in reducing this obnoxious weed to a minimum.

Where lawns are in poor shape because of soil conditions or choice of improper seed, correcting the major faults must be done before remaking the lawn.

Fall Pruning Operations

It is easy to distinguish between live and dead branches in early autumn before the leaves fall. Cut dead branches back to a live branch or to the trunk. First undercut the dead branch with a few strokes of the saw close to the point where the branch is to be severed. Complete the cut from the upper side, making a clean cut with a sharp saw. A folding half-moon pruning saw is suitable for the purpose. Similar types are available on light poles for work in trees where it is difficult to reach all the branches by hand.

Pruning to improve plant structure by heading back one limb of a pair that meets at a narrow angle and thinning out excessive branching to permit air circulation and light penetration can be done while working over trees to remove dead branches and weak growth. Cuts up to an inch in diameter can be left untreated in vigorous trees, but a larger exposure of wood should be painted over with a wood preservative such as shellac or horticultural asphalt.

Extensive pruning of large trees is best undertaken by professional arborists who have adequate tools and carry insurance on personnel and property.

Thinning out shrubbery may be done in autumn, but where semi-hardy types are concerned, spring pruning is preferred. Cuts should be made at a bud or at a branch, except where extensive thinning out is to be done, and then branches are best cut out close to the ground. Vigorous shoots among subsequent sucker growth can be selected during the following season for rejuvenating old or oversized plants.

Preparing the Garden for Winter

Semi-hardy plants such as boxwood, tender azaleas, roses, and the like should be kept free from disease and pests so that they will have a maximum amount of effective green foliage through the fall period. After temperatures have dropped in late October and November, watering of the soil will be advisable if the fall has been deficient in rain. Mulching of the soil surface with oak leaves or similar material of open character and good insulating value will help to stabilize soil temperatures during the winter by reducing variation in temperature and by reducing the length of time that the soil is frozen, also mulches reduce the depth to which the soil is frozen.

Semi-hardy evergreens should have light winter shade as well as mulching. A north exposure is often adequate. Light shade from trees or from hardy evergreens may well be enough. Boxwood, rhododendron and the like growing on the east and south side of a house or garden wall usually require some artificial shade from pine boughs, burlap or lath (snow fence). This shade should be in place in late November before severe freezing weather occurs.

LOOKING FOR A GIFT?

MEMBERSHIP IN
THE NEW YORK BOTANICAL GARDEN
IS THE BEST POSSIBLE GIFT
for a relative or friend,
bringing pleasure the year through.

In his annual report (pg. 135, The Garden Journal, July-August 1955) Charles B. Harding, President, suggested that members of The New York Botanical Garden send in names to which membership literature may be addressed.

Have You Acted on the President's Suggestion?

MEET THE LATIN NAMES

By **Emily Gibson Latham**

NOT ALL OF THE unpronounceable and outlandish-looking names you will meet in plant catalogues come from those of men. Some of them are compounded of Greek and Latin words which add up to short descriptive phrases, telling a definite fact or facts about the plant. They may refer to its native country or to its preference in soil and growing conditions, or they may state some peculiarity of leaf, flower, structure, or habit.

Perhaps, in looking through your catalogues, you skip over the tough names. If so you are missing interesting and beautiful plants, and a little study of their names will lead to a desire for further acquaintance. *Ammobium,* for instance, is an easy and attractive annual with small pearly white marguerite flowers on tall branching stems, most useful for mixing in bouquets and invaluable as an everlasting. Its name, coming from the Greek *ammos,* sand, and *bios,* life, indicates that it flourishes in sandy soils. *Aethionema* is a charming rosy-flowered little rock plant sometimes called Persian candy-tuft. Its name, derived from the Greek *aitho,* to scorch and *nema,* filament, refers to the burnt appearance of the stamens.

Salpiglossis, Schizanthus, and *Schizophragma* are names to make one pause, but all three are really delightful plants. *Salpiglossis* and *Schizanthus* are annuals that are grown in gardens and greenhouses for their showy, variously colored blooms, while *Schizophragma* is the so-called climbing hydrangea, a handsome hardy vine. *Salpiglossis,* from the Greek *salpynx,* tube, and *glossa,* tongue, referes to the tube-shaped coralla and tongue-like pistil. *Schizanthus,* from *schizo,* to split, and *anthos,* flower, describes the deeply-cut petals which give the plant the airy beauty that inspired its English name, butterfly-flower. *Schizophragma,* from *schizo,* and *phragma,* a wall, refers to the splitting of the inner seed walls, a distinguishing botanical characteristic.

Here we might repeat that many plants with striking flower or foliage bear names not for these obvious distinctions, but for some inconspicuous or even hidden structural part. Many thousands of plants have had to be named, and this work has been done by botanists who are primarily interested in classification. On the whole, the names they have chosen have been remarkably descriptive, even giving to some plants names purely in praise of their beauty, as *Chiondoxa,* literally glory-of-the-snow, and *Gloriosa,* the brilliant climbing glory-lily.

Among names of botanical significance are two that are frequently stumbling blocks to the amateur gardener, *Pachysandra,* the ubiquitous groundcover, and *Pachistima,* the very elegant little evergreen plant being advocated as a hardy substitute for box. *Pachysandra* (pakisandra) comes from the Greek *pachys,* thick, and *andros,* stamens (male); *Pachistima* (pakisteema) from *pachys* and stigma, pistil. Penstemons, attractive perennials for the summer border, received their name for the number of their stamens, *penta,* five. Actinidias, woody vines with handsome foliage, were named because of a distinguishing characteristic — their radiate pistils; the name, *Actinidia,* is derived from the Greek *aktinos,* a ray.

Many gardeners hesitate over the pronunciation of *Gypsophila.* The accent is on the second syllable (gipsofila); and phila is pronounced as in Philadelphia. The name comes from *gypsos,* chalk, and *phileo,* to love. I know some people who have faited to raise this plant in acid soil. Had they known the meaning of its name, they would have understood why their efforts were unsuccessful.

Many amateurs prefer to call platycodons balloon flower, which is a good name, describing the round, inflated-looking flower buds. *Platycodon,* from *platys,* broad, and *kodon,* bell, is also a good name, describing the wide flat bell of the open flower. In another case of two equally descriptive names, the common name is rapidly being discarded in favor of the Latin. Instead of day-lily we hear a great deal nowadays about hemerocallis and its hybrids. The botanical as well as the common name refer to the flower living only a day; *Hemerocallis* from the Greek *hemera,* a day, and *kalos,* beautiful — beautiful for a day. Another name that tells the time of blossoming is *Mesembryanthemum,* the succulent groundcover, sometimes called ice plant, grown outdoors in California but not hardy in the East. It comes from *mesembria,* midday, and *anthemon,* flower, telling of the habit of the flowers to open only in full sun and to close in shadow.

A name which seems to throw many amateur gardeners and has no English alternate (unless it is applewort which is practically never heard) is *Cotoneaster* (kotoneeaster). It is derived from *Cotoneus,* Pliny's name for the quince, and a contraction of *ad instar* meaning like—quince-like. These decorative shrubs, most of them introductions from China, belong, like the quince, to the Rose Family. One of the best known is *C. horizontalis,* frequently used for rock and bank plantings because of its low horizontally spreading branches with small shining foliage and bright red fruits.

One would naturally expect attractive fruits to enter into the names of plants, and they do in *Callicarpa* which literally means beautiful fruit, and is commonly called jewel berry. *Symphoricarpos racesmosa,* the snowberry, derives its sonorous composite name from the Greek *symphorein,* to yield together, and *karpos,* fruit, referring to the thick crowding of the berries along the raceme.

Among plants with names based on their seed is *Lithospermum,* a charming purple-flowered rock lover; *lithos,* stone, and *sperma,* seed, describe the hardness of its seed. Gardeners looking for interesting evergreens must sooner or later run into *Retinospora,* and this name has been superceded by the equally mouth-filling *Chamaecyparis,* meaning dwarf cypress. *Retinospora,* derived from *rhetine,* resin, and *spora,* seed, refers to the resinous fruit. An inflated bladder-like fruit covering is described in the name of the perennial border plant, *Physostegia* (false dragonhead). The name is compounded from *physos,* bladder, and *stege,* covering. We meet *physos* in *Physalis,* the Chinese lantern flower, referring to the inflated seed covering which makes the bright orange "lantern."

Names beginning with X and Z certainly look very strange to us. Some of them derive from *xeros,* Greek for dry. (A xerophyte is a dry-soil plant.)

(Continued on page 165)

FOR THAT SHADY SPOT

By Dorothy Ebel Hansell

The royal fern, *Osmunda regalis,* enjoys a cool moist location.

FIRST OF ALL, how shady is the spot to be planted? There is, you know, shade — and shade. That is, there are degrees of shade — complete, partial or half, and light. For instance, a large hemlock with low sweeping branches furnishes complete shade. Certain deciduous trees whose branches are broad spreading and whose foliage is heavy throw deep, practically complete shade in summer. The foundation planting of a structure facing north is in complete shade. True, in midsummer, the sun may penetrate but for such a short time each day that the plants do not derive much benefit from its rays.

Deciduous trees with tall trunks that branch well above the ground or deciduous trees whose foliage is not heavy furnish light shade. Plants in a border which receives filtered sunlight off and on the better part of the day but little direct sunlight are growing in light shade. Plants on the north side of a low rock wall are also in light shade. A clearing in a wooded area where sunlight flickers through the leaves furnishes a place to plant in light shade.

Somewhere between complete shade and light shade, conditions exist which are defined as half shade. A perennial border or a shrub border with an eastern exposure receives morning sun; with a western exposure, afternoon sun. In each case, the border is in half shade. It is to be remembered, of course, that late afternoon sun is not as strong as is morning sun.

So, in order to select plants for that shady spot, it is essential to know what degree of shade prevails. There are relatively few plants which endure full shade; there are quite a few plants that really enjoy half or light shade; and there are other plants which may not give their best performance but tolerate some shade.

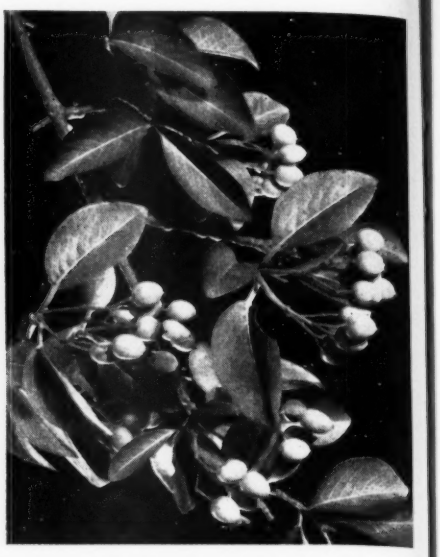
What can we suggest to the owner faced with the problem of selecting plant material for a foundation planting in full shade? Yews — sturdy, reliable, undemanding — head the list for this particularly difficult situation. The American yew, *Taxus canadensis,* is generally the one recommended for any degree of shade — full, half, light; but we had *Taxus cuspidata* and *Taxus baccata repandens* in a north-facing foundation planting for twelve years. These two yews are usually recommended for planting in light shade. The cuspidatas grew to such huge proportions that we had to have them removed. It took three men with hawser and pulley to lift them with roots intact so they could be transplanted to a community park. There were compensating factors, however — the soil had been thoroughly prepared at the time of planting and the yews were fed occasionally—for the deep shade. The Hatfield yews, which replaced them three years ago, are growing lustily.

Korean box, *Buxus microphylla ko-*

These two ferns, *Athyrium felix* and *Osmunda cinnamomea,* appreciate some shade.

In early spring erythroniums carpet a shady spot with their mottled foliage and nodding yellow flowers.

The white flower spikes of *Clethra alnifolia* fill a midsummer's evening with their fragrance.



The fruits of *Viburnum alnifolium* are one of its attractive characteristics.

reana, is an excellent low accent shrub and it wants shade. A small plant set out for a foundation planting fifteen years ago is now a compact, round specimen, five feet across. It has come through, winter after winter, unscathed; and even though buried beneath snow and ice in the severe winters of 1946 and 1947, this hardy evergreen showed no ill effects.

Mugho pine, *Rhododendron catawbiense* and *R. maximum, Leucothoë Catesbaei,* and mountain-laurel *(Kalmia latifolia)* can be planted in complete shade. But the laurel is likely to become scraggly, and it does not flower as generously as it does in partial shade.

Leucothoë, when well grown, is a very distinctive shrub. In spring fat red buds, which have been in evidence much of the winter, open into white bell-shaped flowers. These are suspended in drooping racemes along the arching branches. The leaves are then a leathery deep green, having lost their winter tones of copper and rich wine. Leucothoë makes a very statisfactory fore- or under-planting with rhododendrons.

English ivy, trailing euonymus, pachysandra, and vinca are dependable groundcovers for shady spots. However, it is only fair to state that we have noticed fewer of its dainty blue flowers on the vinca in the foundation planting in full shade than on the vinca in the shrub border which receives more sunlight. *Pachistima Canbyi* is a pleasing groundcover with acid-loving plants — this is a trailing evergreen shrub about eight to ten inches high.

If the foundation planting is more fortunately situated so it enjoys light to half shade, there is a greater choice of plant material. The Japanese hollies, *Ilex crenata* and *I. crenata convexa* are very desirable; and if one is not striving for a formalized effect, *Ilex glabra,* the native inkberry, of more open habit is another possibility. Japanese andromeda, *Pieris japonica,* is a very choice shrub for the foundation planting, for it can justly claim all-season interest — drooping panicles of little white bells and the reddish color of the new growth in spring, glossy green foliage and fruit capsules in summer, and the reddish buds that appear in late fall and look as though they were ready to burst into bloom at any time during the winter.

Black cohosh, *Cimicifuga racemosa,* is a stalwart perennial for a partially shady spot.

Mountain-laurel, as already mentioned, does very well in light to partial shade. Rhododendrons, azaleas, *Euonymus Carrierei* (evergreen shrub), English and Japanese yews, all these thrive in light to half shade and are suitable for foundation plantings under such conditions. The very handsome evergreen, *Mahonia aquifolia,* or Oregon holly-grape can also be used, especially if you want something in your foundation planting your next-door neighbor is not likely to have in his. However, as mahonia tends to winter burn and because of this weakness doesn't look too happy in March, you will have to give it some protection from late winter sun and wind.

Perhaps the shady spot is located at the rear of the property — and the ground is generally damp, sometimes even wet. What can be done? You can, of course, drain the land by laying agricultural tile, then add fill and topsoil and plant accordingly; or you can create a little woodsy scene — a cool and appealing retreat for a warm summer's day — using plant material that takes kindly to moist, shady conditions.

If you already have some oaks and a tulip-tree, you might like to add the

Wood-fern, *Dryopteris felix-mas*, and wild ginger, *Asarum canadense*, are happy in light shade.

sweet-gum or liquidambar, one of the most colorful of all trees in the fall. The star-shaped leaves, glossy green in spring and summer, change into brilliant yellow, scarlet, red, and even purple in the fall. It is a tall, symmetrical tree and it really prefers rich moist soil. If you want an ornamental small tree for this damp, partly shaded area, try the hornbeam. It, too, furnishes lovely autumn color — the leaves turn a glowing orange-scarlet and yet have an almost translucent texture. The hornbeam is also called blue beech, as the bark of the young tree resembles the bark of the beech. Its catkins are interesting in early May, and it bears curious nut-like fruits in late summer.

Would you believe that twenty or more trees like moist land—pin, swamp and mossy-cup oaks, the tulip-trees and the sweet-gum, black ash, black birch, the silver and red maples among them—and that a number of attractive shrubs like or are tolerant of a damp, partially shaded situation?

There's the benzoin which appears to be clad in a film of greenish yellow in late March or early April, when the small flowers are borne in profusion before the leaves appear. In the fall, the leaves are a clear yellow; bright red berries add to the seasonal display. When you brush against the leaves or crush the twigs, they give off a spicey odor, for this is the shrub that yields tincture of benzoin.

Another early spring bloomer is the lovely shadbush, which bears its pure white, fragrant blossoms as its gray-green leaves develop. Actually, most of the abundant blow appears before the leaves. The fruits which follow are small and dark blue. The bark is interesting — that of the young branches a brownish red, of the trunk a soft greenish gray. The shadbush is happy at the edge of light woods or under the shadows of towering trees on the bank of a stream. Though technically *Amelanchier canadensis* is a tree, its habit is more nearly shrub-like hereabouts.

Are you acquainted with the high-bush blueberry? We regard *Vaccinium corymbosum* as one of the most desirable shrubs for a moist spot in light shade — or sun. Yes, it grows in sun and in light shade, but always where the soil is moist. Dainty, greenish white bells in spring are followed by blue-black fruits and shiny green leaves;

Azaleas, mountain-laurel, anchusa and pulmonaria are planted in this bird sanctuary.

This is an inviting shade garden with its small pool and appropriate plant material—birch, rhododendrons, pieris, ferns, violets, ajuga and creeping crowfoot.

autumn tints the leaves a most appealing rosy red.

We also place sweet pepperbush, *Clethra alnifolia,* high on the list of native shrubs that merit wider notice. While its natural habitat is a damp moist woods, where it develops into specimens eight to ten feet high, it can be planted as a hedge or screen in good garden loam in light shade. You can prepare the soil well, incorporating plenty of leafmold, and supply water, should a prolonged dry spell occur in summer, and the sweet pepperbush will respond very satisfactorily. Its erect racemes of white flowers possess a heavenly fragrance, and its leaves, a lustrous green, are crisp and fresh-looking even on the hottest midsummer day. We have a natural hedge along part of our property and several specimens in the woodland garden. One of the latter is over ten feet tall, better than six feet across, and a mass of fragrant blooms as this is being written in mid-July.

Another white-flowered shrub that contributes fragrance and a cool look to our home grounds in late June or early July, depending on the weather, is the swamp azalea, *A. viscosa.* The lovely pink-shell, *A. Vaseyi,* also prefers a humusy, moist, shady location, as does its pretty relative, the pinxter flower, *A. nudiflora.* The flower color of the latter varies on different bushes—from white through a delicate to a deep pink.

Native viburnums like the moist soil and shade in varying degrees; that is, some of the species, *V. dentatum, lentago, prunifolium,* and *trilobum* enjoy the light shade at the edge of wooded areas, while *V. acerifolium* is found within the woodlands, growing under oaks, hickories, and tulip-trees. The foliage of the maple-leaved viburnum is especially colorful in the fall when it turns a warm rosy crimson. Attractive in flower, fruit and autumn coloring, viburnums are not only useful for planting in a woodland garden but serve as excellent background material or as specimens in a shrub border.

The ground beneath these aforementioned trees and shrubs can be transformed into a floral carpet of trout-lilies, false-lily-of-the-valley, trilliums, blood-root, foam flower, ginger, spring beauty, rue anemone, violets, hepaticas, Jack-in-the-pulpit, lilies-of-the-valley, may-apple, partridge-berry, galax, sweet woodruff, Virginia bluebells, interspersed with tall shade-loving perennials such as white and red baneberries (*Actaea alba* and *rubra*), snakeroot (*Cimicifuga racemosa*), goats-beard (*Aruncus sylvester*), Solomon's Seal (*Polygonatum biflorum*), and false Solomon's seal (*Smilacina racemosa*) and with cinnamon, interrupted, and royal ferns, lady-fern, woodfern, Christmas fern.

Does this exhaust the possibilities of plant material for that shady spot? By no means! What of the enchanting tuberous-rooted begonias for planting along a shady driveway, in the foreground of a shady shrub border, or in a shady corner of the terrace? With the exception of *B. Evansiana,* the only one hardy in this locality in a protected place, tuber-

Tuberous begonias fill a bed in light shade with their rich foliage and gorgeous blooms.

ous begonias must be started indoors in March or April, then transplanted outdoors after warm weather has arrived.

And what of the hostas which mass well in light woodland or effectively line a tree-shaded approach to house or garden. The sturdy luxuriant foliage is the dominant characteristic of the different plantain - lilies. The foliage may be dark green as in *H. caerulea,* bright glossy green as in *H. plantaginea,* bluish green as in *H. Sieboldiana* and *H. Fortunei,* variegated as in *H. Fortunei marginata* and *H. lancifolia albo-marginata.* Hostas are easy doers, seem to thrive in spite of neglect, and are decorative from the time their leaves unfold in late spring till they are back in the fall.

We haven't said anything about partial or acid soil; but for ericaceous plants — azaleas, rhododendrons, hollies, pieris, mahonia, mountain-laurel — it is a must. The osmunda ferns (cinnamon, interrupted, royal) also like acid soil, as do the trout-lilies, false lily-of-the-valley, foam-flower, galax, may-apple, and partridge-berry.

MEET THE LATIN NAMES **(from page 160)**

Xeranthemum means dry flower, and it is an excellent everlasting. *Zanthorhiza,* formidable as the name looks, simply means yellow-root which is the English name of this feathery groundcover so useful for damp shady spots. It is compounded from *zanthos,* yellow, and *rhiza,* root.

Having run through some of the strangest sounding of the names listed in plant catalogues, it might be interesting to list briefly the meaning of some of the more familiar ones.

Aconitum, monkshood, from Greek *akonitum,* a poisonous plant; from the root of the aconite is extracted a poisonous alkaloid used in medicine.

Achillea, yarrow, named in honor of the Greek hero, Achilles, who was supposed to have used it on his wounds.

Antirrhinum, snapdragon, from Greek *anthos,* flower, and *rhinos,* nose or snout—snout-flower.

Aquilegia, columbine, from Latin, *aquila,* the eagle. (Columbine is from Latin, *columba,* the dove.) Both refer to the shape of the winged petals which might be thought to resemble a bird. Bailey claims that the name is not from *aquila* but from *aquilegus,* a water-drawer, but the application is not clear.

Artemisia, wormwood, in honor of Artemis, Greek prototype of Diana. Bailey claims it is from *Artemisia,* wife of Mausolus whose tomb started the mausoleums.

Asclepius, milkweed, for Asclaepius, Greek god of medicine.

Azalea, from Greek *azaleos,* dry, a name given the plant by Linnaeus who was under the impression that it prefers dry soils.

Baptisia, false indigo, from Greek *bapto,* to dye; a blue dye was extracted from this plant.

Dianthus, pink, from Greek *Dios,* God, and *anthos,* flower — flower of Jove, chief of the gods.

Digitalis, foxglove, from Latin *digitalis,* finger of a glove.

Echinops, globe thistle, from *Greek echinos,* a hedgehog — very descriptive of the round, bristly flower.

Euonymus, from Greek *eu,* good, and *onoma,* name, of good repute—well applied to the handsome shrubs and vines of this genus.

Fritillaria, guinea-hen flower, from Latin *fritillus,* a chess board, referring to the chequered marking of the petals.

Geum, avens, probably from Greek *geuo,* to have a taste, referring to the roots.

Helianthus, sunflower, from Greek *helios,* sun, and *anthos,* flower.

Hydrangea, from Greek *hydor,* water, and *aggeion,* vessel, referring to the cup-like fruit.

Iberis, candytuft, from Iberia, Spain.

Iris, for Iris, the rainbow, messenger of the gods.

Linum, flax, from Latin *lin,* flax.

Lupinus, lupine, from Latin *lupus,* the wolf, alluding to the plant exhausting or preying upon the soil.

Myosotis, forget-me-not, from Greek *mys,* mouse, and *ous, otos,* ear, mouse-ear. (A French common name for *Myosotis* is *Oreille de souris.*)

Nepeta, catmint, from Nepete, an Etrurian city.

Nigella, Love-in-a-Mist, from Latin *niger,* black, referring to seed.

Oenothera, evening-primrose, from Greek *oinos,* wine, and *thera,* imbibing; decoction from the plant was supposed to stimulate the appetite for wine.

Polemonium, Jacob's ladder, from Greek *polemos,* war; Pliny records that there was dispute over the discovery of this plant.

Portulaca, from Latin *portere,* to carry, and *lac,* milk, referring to the milky juice in the stems.

Pulmonaria, Mary - and - Martha, from Latin *pulmo,* lung, suggested by shape of the leaf. In the Middle Ages, according to the Doctrine of Signatures, the resemblance of the leaf to a lung indicated that the plant was a cure for lung diseases.

Pyrethrum, from Greek *pyr,* fire, referring to acrid root.

Paeonia, peony, from Paeon, Greek physician of the gods, who was supposed to have discovered the medicinal properties of this plant.

Papaver, Poppy, from Greek *papa,* pap, referring to milky juice in stems.

Primula, primrose, from Latin *primus,* first, earliest flower of spring.

Rhododendron, from Greek *rhodon,* rose, and *dendron,* tree. Rose-tree.

Rosa, rose, origin obscure. Latin *rosa,* Greek *rhodon.* The rose has so long been loved and cultivated that the meaning of its name seems to have been lost in antiquity.

Sedum, Stonecrop, from Latin *sedere,* to sit, referring to the tight seating of the plant in rock crevices.

Sempervivum, hen-and-chickens, from Latin *semper,* always, and *vivens,* living, referring to the plant's perpetuating itself by constant offshoots.

Statice (prnounced statisee) from Greek *statikos,* stopping, referring to powerful astringent properties in some species.

Thymus, thyme, from Greek *thyo,* to perfume.

Trillium, from Greek *trilis,* triple, referring to leaves and the parts of the flower being in threes.

Trollius, globe - flower, from Old German, *trol,* round, referring to the shape of the flower.

Tulipa, tulip, from Turkish *tulban,* turban; the tulip was brought from Turkey in the Sixteenth Century.

Verbena, vervain, ancient Latin name meaning any green herb used to strew on floors or in the arena.

Veronica, speedwell, for St. Veronica.

Viola, violet, ancient Latin name for the violet. Its original meaning, like that of rosa, is obscure.

Vinca, periwinkle, from Latin *vinculum,* a band, referring to the long, flexible shoots.

Yucca, Adam's needle, the Carib name.

BARNHART (from page 151)

need to know and which no one expects a botanist to know.

But all this was routine; it fails to give a true picture of Barnhart's place in the botany of the last fifty years. At the turn of the century vast numbers of new plants were being collected, named, and classified, particularly in America. Differences of opinion were inevitable about the taxonomic status and particularly about the naming of these plants. De Candolle's rules of nomenclature, published in 1867, did not foresee some of the difficulties that would be encountered, and several schools of interpretation arose in Europe and in this country. Controversy was sometimes bitter and occasionally even personal. Barnhart, through his extraordinary knowledge of botanical literature and history, was early drawn into nomenclatural discussion; he was writing papers on botanical nomenclature even before he had completed his medical studies in Columbia University, and before he had joined the staff of the Garden. To this pursuit he brought, besides encyclopedic knowledge, exceptionally logical habits of thought and great clarity of conception and of expression. He was a member of the committee of the Botanical Club of the A.A.A.S. which was formed to draw up new rules of nomenclature, and which produced the famous American Code of Botanical Nomenclature; this was first published in 1904, taken to the International Botanical Congress of Vienna in 1905 (to which Barnhart was a delegate), rejected or disregarded by the Europeans there assembled, and republished with some amendments in 1907. For the ensuing twenty-three years The New York Botanical Garden, under the leadership of Nathaniel Lord Britton, was the focus of the American Code. Its chief principles — particularly the "type method"—finally won recognition abroad in 1930 and now form part of the current *International Code of Botanical Nomenclature*. Though Barnhart's name does not appear among those of the Editorial Committee, he was nevertheless influential in the development of this document, which now has the adherence of almost all botanists all over the world.

Meanwhile the Garden was publishing the first hundred parts (or thereabouts) of its great project; a North American Flora, to include descriptions of plants of all groups growing wild on the North American continent and in the West Indies. The first part of the *Flora* was issued on 22 March 1905. Various botanists contributed, members of the staff of the Garden and specialists on various groups who were not members of this group. Barnhart from the beginning had most of the responsibility for the editing and particularly for the bibliography, as well as for such details as the design of the format and the proofreading. For such work he was well fitted by his patience, his precision, his logical and methodical attack on problems involving detail, as well as by his enormous bibliographic knowledge. The style of citation which he developed (essentially the "Madison rules" of 1893) has become a model for taxonomists generally and has been widely imitated. Though this may seem to be of small importance in the pursuit of science, it is safe to say that accuracy and clarity of citation are often in inverse ratio to error and confusion of thought, particularly in taxonomy. The present *International Code* contains a guide to methods of citation which is the direct offspring of Barnhart's system. The same qualities which were so well used in the production of *North American Flora* contributed to the publications of the Torrey Botanical Club. He was editor for several years, vice-president for many years, and finally president. As editor he furthered the same ideals of good format, good printing, and precise bibliography as in the *Flora*: qualities which still characterize the publications of the Club. The "Index to American Botanical Literature" which appears in every issue of the Club's *Bulletin* embodies the same methods and the same care in citation.

It is possible that to list Barnhart's achievements may evoke an image of austerity, of a recluse, a bookworm, spending his life ferreting in old records. In a sense he did live in this way. But a man's life is measured not only by what he does but by how he does it.

The first quality of Barnhart's activity was an enthusiasm for his subject which was often contagious. If you went to him with a question, however trifling, he would drop whatever he was doing and tell you all that he knew about the matter. More, he would cite the volume and page of the obscure periodical in which additional information could be found, and help you track it down in the library. Still more, even after your original question was satisfied and you were inclined to drop the subject, he would be discovering additional sources of new information to add to his own store, and would pursue you around the library with them—all with the good humor of one enthusiast to another. The information that reached you was not—as one might expect—a miscellany of scraps; but set in order, logically marshalled, clearly phrased. The same qualities were evident in his correspondence. He never learned to use more than two fingers on a typewriter, and most of what he wrote was in his neat, square handwriting, which changed little even in his old age. And the calligraphic style somehow fitted the English which it embodied, English with precision, with charm and humor, and a faintly Victorian flavor.

Finally, the impression of this man that remains with those who knew him, with the many who came to consult him, is of a vast benignity. I knew him only during his latter years: a short, somewhat rotund figure, with a capacious brow unmarred by any remains of hair, and a friendly twinkle behind old-fashioned glasses. Courtesy, kindness, generosity were inherent in all his dealings—qualities without which scholarship is a dreary enough desert. Had Barnhart achieved nothing but this, he would still live long in the affections of his friends.

Dr. Barnhart died November 11, 1949.
—The Editor

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FOR THE YOUNGER GENERATION OF GARDENERS

Grandpa's Letters to Janet

"Did you hear what he said?"

"Yes, he said there were reports of another hurricane coming. I hope it doesn't strike here. We have had more than enough." Old Oak and High Hem were talking to each other in the Hemlock Forest of The New York Botanical Garden. Two men had just gone by on the path, and the trees had heard what they said.

The man who wears a blue uniform and cap is known to the trees. He is a friend of all trees and most boys, but not the boys who cause damage in the Hemlock Forest or start fires. Many times this man in blue has saved the trees from being burned. The trees are very fond of him and often greet him with "Hi, Mack." Then he taps them gently with his cane. Visitors who know about this, think they hear the trees go "crack, crack."

The conversation between the trees continued; sometimes in whispers, but when the wind blew hard, they had to shout. They were discussing the effects of the last hurricane. High Hem remarked "You know there aren't nearly as many hemlocks standing in the forest as there were twenty years ago. The first bad hurricane came in 1938, another in 1944, and a third in 1950. Got so we expected one every six years, but 1954 was an exception and a very bad year. We had so many hurricanes they gave each a name."

Old Oak remembered. He, too, had weathered those storms. "Yes, we lost many old friends," said he. "It was an awful sight to see them lying on the ground, some of them across the path. The men had to bring power saws to cut them up and unblock the paths."

High Hem, reminiscing further, said, "Remember my old side partner, Hemlock Harry? We grew up together. He was over one hundred years old when he was taken. During the first hurricane I heard him say, 'Can I lean on you, High'? Sure, sure, said I, but right after that came the next big blow, and he said, 'It's no use. My roots have lost their grip. Goodbye, High,' and with that he crashed to the ground. Terribly, terribly sad that was. I saved the lives of two squirrels and a flock of chickadees that came flying through the air as Hemlock Harry went down. I reached out my arms and caught them all safely. Seemed like it was raining chickadees."

High Hem, still going strong, continued. "You know how all this hurricane business started?"

Old Oak admitted he didn't know, so High went on, "I suppose you know we hemlocks are the last survivors of the Forest Primeval in and around New York City."

"I've seen it so stated on that sign that used to be posted on the path," said Old Oak.

"Exactly," said High Hem, as he struck back at Mister Wind and swished him away with his branches. "There's that trouble maker now. Mister Wind read the sign too, years ago, and I remember how he howled and hissed. 'Last survivors,' he sneered, 'but it won't be long now. All the other New York forests have been cut down, burned down, or blown down. Hemlock Forest is next on our list. Right now I'm sending for Mister Hurricane to mow you down complete.' That was in 1938, and eight big trees went down in one small space near the Boulder Bridge. So it went all through the forest. Those other hurricanes have all had a whack at us, and only the fittest hemlocks have survived."

Now conversations in the Hemlock Forest are seldom as sad as this. Many pleasant things happen every day and the trees are a very happy family. When they talk about old times and the things they used to see, they mention deer, bear, foxes, and squirrels. Now they see squirrels, turtles, muskrats, and lots of birds. They used to watch little Indian boys practise shooting with bow and arrow. Now they see Boy Scouts with binoculars, learning about many different kinds of birds.

You should be there at daybreak, Janet, to see the hemlocks greet the sun. They rub their eyes gently, drink the dew on their leaves, and listen to the singing of the birds. Such a cheerful chorus to start the day. So come again and again to see the Hemlock Forest in The New York Botanical Garden.

"This is your invitation," says High Hem, the big hemlock tree, "to visit us at any time of year. Now when the autumn is coming and the leaves are falling off some trees — we don't lose ours you know, or come in winter when snow covers the ground; or in spring when everything is renewing itself and smells so fresh and green. And come in summer, for the Hemlock Forest is one of the coolest spots in all New York City."

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BOOK REVIEWS

GREEDY GARDENERS. Richardson Wright. 95 pages, illustrated. J. B. Lippincott, Philadelphia, Pa. 1955. $3.50

Anyone fortunate enough to know "Dick" Wright — preferably, of course, as a friend and kindred spirit to chat with, but otherwise by having read his ten books and countless articles on gardening and having listened to his "remarks" on all kinds of subjects — will rejoice that, when he cut loose from his editorial pursuits and migrated from Connecticut to Cape Cod, he by no means stopped gardening, thinking about gardening, and setting down his thoughts. Perhaps that should surprise no one. But, after all, in November, 1954, he received from the Massachusetts Horticultural Society a citation stating that, "Your garden books and all your writings have permanently enriched the literature of horticulture because you have always approached the age old rhythm of gardening with an abundance of human warmth and feeling." After that, no one would be criticized for sitting back and taking it easy.

But not so Richardson Wright. And his latest book, *Greedy Gardeners,* though more slender than usual, is just another casual, informal expression of his views, ideas, and recommendations such as we have long since come to know and enjoy. Indeed, he not only admits to being offhand and casual in his discussions, but asserts that, "That, sirs, is the proper approach to them. Too many gardeners' books get all hot and bothered about plants . . . Let's take it easy! Gardening should be a serene occupation."

So that's the spirit in which he goes at such varied subjects as Roses, Lilacs, Lilies, Narcissus, Shrubs and Small Trees, Iris, House Plants, Garden Diaries, and the subject of his title—"Greedy Gardeners"—who are not greedy in an unpleasant, grasping, selfish way, but because "One kind of a plant does not satisfy them." To them, he says, it is like a cigarette to a pipe smoker, or (as expressed in the title of his first chapter) "An Oat to a Horse."

The book is as personal as it is casual—and all the more enjoyable in consequence. "I suspect," Dick concludes, "should I live to ninety, I would go on writing bits and pieces about growing things." I hope he does. We all do. And I think the chances are good that he will. For he closes this book with a cheery, "Good-bye for now. I'll be back." That's bully.

E. L. D. Seymour
American Home Magazine

GARDEN DESIGN ILLUSTRATED. John A. and Carol L. Grant. 145 pages, illustrated. University of Washington Press, Seattle. 1954. $5.75

This is an excellent book, well written and beautifully illustrated with many good photographs and a number of carefully drawn plans. However, it is not about garden design in the usual sense; instead, it is a welcome and worthwhile book on planting design — a discussion of the design qualities of plants themselves and how to combine them artistically. While the authors are chiefly interested in West Coast plants, some of which are unfamiliar to us, still this book will appeal to all who love plants and might be carefully studied by those who are interested or engaged in landscape design.

The scale or size relationship of plants is discussed in one chapter, and suggestions are made for increasing the apparent size of the small property.

Form and structure of plants, so important in the year-round garden, are given careful treatment by the authors. They discuss trees with great respect and warn against using too many on the small place. Due warnings accompany the discussion on conifers, but it is in the chapter on broadleaved evergreens that the authors outdo themselves. Unfortunately, not all of this material is happy in our gardens, but the excellent suggestions for using it can be applied. Both photos and text illustrate rhythmic gradations of texture and suggest varieties and quantities needed to achieve these results.

Firm believers in the informal or asymmetric landscape, the authors illustrate and discuss tree and shrub beds with curved boundaries, resulting in a series of recessed bays and out curves or promontories built up with taller material; they suggest this treatment to increase the apparent size of the small property. In order to keep this strong year-round form, flowers are used in the recessed bays where they are displayed against a background of deciduous shrubs or boundary fence. Especially helpful, too, is the illustrated chapter on how to arrange annuals and perennials in "drifts" and the discussion of color sequences with flowers and flowering shrubs.

Nelva M. Weber
Landscape Architect
New York City

CAMELLIAS IN THE HUNTINGTON GARDENS. William Hertrich. 380 pages, illustrated, indexed. Huntington Botanical Garden Library, San Marino, Calif. 1954. $10

The first thirty-six pages of William Hertrich's camellia book are divided into two sections. Part I contains an introduction and discussions of History, Climatic Factors, Culture, Propagation, Pathology and Pest Control, Behavior Patterns, Landscaping with Camellias, and Camellia Vogues, accompanied by seven page illustrations of Camellia Leaf Virus (1), Fruits (2) and Leaf Forms (4). Part II is made up of Classification Notes, Color Code and Glossary. These are followed by Part III, Flower Descriptions and Plates in which 249 horticultural varieties of *Camellia japonica* are described and illustrated with black and white plates from photographs. There are also a colored frontispiece and two inserts in color. The foreword is by Ralph S. Peer, a foremost American student and collector of camellias.

Varietal descriptions are concise and in nearly all instances quite complete. Synonyms for most varieties are included but information covering origins, of great value in nomenclatural studies, is often lacking. For the most part the flower illustrations are excellent, but in some, details of their centers are lacking due to poor lighting and in a few cases the specimens shown are atypical. Leaf details, which are also important, are almost entirely absent. For three things, the author is to be commended: the use of metric measurements, not often found in American horticultural books, a sound camellia classification based on flower anatomy and not on their resemblance to those of other plants, and the "Royal Horticultural Society Colour Chart."

This volume is a noteworthy and valuable contribution to camellia literature. Throughout there is evidence of meticulous attention to details. In spite of this, some errors have crept in, none of them serious. The book, free of typographical mistakes is yet to be made. Volumes covering additional varieties are to follow.

H. Harold Hume
University of Florida
Gainesville, Fla.

PRIMROSES AND POLYANTHUS. Roy Genders and H. C. Taylor, 143 pages, illustrated, indexed. Criterion Books, New York. 1955. (Printed in Great Britain.) $3

Primroses and Polyanthus brings a wealth of information that is timely with the growing interest in primulas in the United States.

The chapters dealing with cultivation and propagation are especially helpful. The strong emphasis, oft repeated, on a soil rich in humus will help gardeners to understand one of the first steps to success with this family of beautiful plants.

The long, descriptive lists of named varieties of *P. vulgaris* hybrids, *P. polyanthus,* double primroses, and *P. auricula* are of great value. When choice, unknown varieties become available here as well as abroad, growers will turn to these comprehensive listings with confidence.

The search by the authors for old and forgotten varieties of single and double primroses reads like a story. Primula lovers everywhere will be grateful to them for the research that has brought again to cultivation lovely old kinds all but lost forever in old cottage gardens and the gardens of ancient manor houses. It is to be regretted that so few will become available here in America, as heretofore double primroses have been little known.

The history of the development of *P. auricula* with cultural information will be of interest to many here in the United States because of the growing popularity of this most adaptable of primulas.

The final chapters give helpful information on staging primulas for shows with judging requirements, etc. A short account of diseases and pests that attack the plants with recommendations for combatting them affords useful knowledge.

Every primula lover will want a copy of this splendid, new reference book.

Betty Jane Hayward
Scarborough, Maine

THE GARDENERS ARE COMING. Samuel M. Taylor. 123 pages. Vantage Press, New York. 1954. $3

Gardeners should, of course, be acutely conscious of the soil erosion problem.

Here an electrical - engineer - gardener proposes something to do about it in a colorful exposition which should be required reading for ladies clubs, sophomores, and congressmen.

Gardeners will read it without compulsion because, regarding us as supermen

(incorrectly, I fear) he charges us with the task, and credits us with the accomplishment of his plan, by his title and his text. We are flattered, but far from confident.

The most admiring advocates of hydro developments must wish that something were done from basin rim all the way down, to keep the soil capital of the hills out of the reservoirs and the ocean. Those who would reject Taylor's thesis as visionary, should note that were the task easy, it would have been done long ago.

The promise of success only by a long laborious, step by step attack, reflects the "engineers' respect for basic facts." (Quoting A. P. Sloan, Jr., of Motors.)

The author's dramatic descriptions of the interactions of earth and water indicate a long and faithful devotion to the subject, and should make fascinating reading for gardener or nature lover.

VICTOR GREIFF
Neponsit, Queens, N. Y.

GARDENS & GARDENING VOLUME 6. GROWING UNDER GLASS. Edited by F. A. Mercer and Roy Hay. 141 pages, illustrated, indexed, Studio Publications, New York. 1955. (Printed in Great Britain.) $4.50

In this concise and well-illustrated book, the authors through their staff of horticultural experts have treated this subject in a very modern and practical manner.

Whether it be greenhouse construction, garden layout or labor-saving equipment, each is carefully appraised for its merits and relative cost. Throughout the book helpful hints in economy of construction and operation through the use of modern materials and equipment are carefully stressed to make gardening a more enjoyable and economical hobby.

While primarily written for British homes and gardens, it nevertheless has practical application in this country as well. The principles of greenhouse construction, operation, and heating remain much the same and are applicable here as abroad. However, the suggested list of greenhouse flowering plants and orchids is quite comprehensive and includes a number that just will not tolerate our hot northeastern summers. The experienced gardener will forego these, but the enthusiastic novice may run aground.

Should your interest be in garden economy, greenhouse construction or merely the culture of greenhouse plants, you should find this book interesting reading and a valuable source of worthwhile information.

JOSEPH W. TANSEY, Supt.
"Uplands"
Mt. Kisco, N. Y.

ATTRACTING BIRDS TO YOUR BACKYARD. W. J. Beecher, 62 pages, illustrated by the author. All-Pets Books, Fond du Lac, Wisc. 1955. $1

The author in this small volume has given many excellent suggestions for attracting birds to our backyard gardens, however small. Protection for birds is of prime importance, and in addition, food, shelter and water must be provided.

In the chapter on "Food and Shelter," Dr. Beecher mentions a number of berry-bearing trees and shrubs that atttract birds for food supplies, and they provide shelter and nesting sites as well. For birds that prefer nesting boxes, specifications are given for making the types of boxes to be used for various species — the size of the box and opening are most important.

Bird baths may be of two types. First, the pedestal type to be used if there are cats in the neighborhood, and, a ground pool which can be made at home. Added to this is a plan for the dripping of water into the pool, a feature much loved by birds.

The chapter on "Attracting Birds in Winter" gives information on how to establish feeding stations. Shrubbery near the house is important as it brings the birds close, and gradually they are attracted to a window-sill feeder. It is then you get the thrill of seeing them near at hand all winter long.

This book will certainly help in identifying birds most likely to be found in your own backyard, and if you follow all the requirements mentioned for the various ways of attracting and keeping the birds, your backyard may become a veritable bird haven at all times.

LUCY F. STONER
Short Hills, N. J.

THE FRIENDLY FORESTS. Alma Chestnut Moore. 96 pages, illustrated by Matthew Kalmenoff. The Viking Press, New York. 1954. $2.50

It is usually not difficult to interest children in animals and their life-histories, but to interest them in plant life requires more skill. Yet all animal life depends completely in the final analysis on the earth's plant covering, and most children's (and adults, too, for that matter!) interest can best be aroused by emphasizing the interrelationship and inter-dependence of plants and animals. *The Friendly Forests* is a book which tells in a charming and skillful way the story of America's forests. It tells how trees grow, how they differ from each other, the problems of life which they confront and surmount, how their seeds are dispersed, and for what we use their wood. Most of all, however, it explains to young and old readers alike in an interesting way the ecology of the forest. We are told how forests aid in the formation of topsoil and in keeping it from washing or blowing away; how they keep our brooks, streams, and lakes clean and fresh, filled with fish and other aquatic forms of life. We are reminded that most of our floods are due to the thoughtless destruction of forests and the killing of dam-building beavers along the rivers' watersheds.

Man's greed and carelesness have destroyed millions of acres of our precious forests — Nature's most perfect air-conditioning system — bringing not only the pollution of streams and other seasonal drying up or flooding and the extermination of game and other wild animal life, but even fundamental changes in climate through changes in rainfall and the production of waste land, dust bowls, deserts, droughts, and famines. The entire economy of nations is often affected when there is thoughtless exploitation of forests — mass migrations, not only of animals, but of men, often result and the course of history itself changed.

The story of our forests is a fascinating one and is certainly one that needs continual emphasis if human civilization as we know it today is to persist. The story is tremendously large, with almost innumerable facets and ramifications, and no single book can tell it all, but here is a book that tells at least some parts of the story — and tells them very well.

H. N. MOLDENKE, *Director*
Trailside Museum, Watchung Reservation
Union Co. Park Commission

CLIMBING ROSES. Helen Van Pelt Wilson. 212 pages, illustrated (drawings by Leonie Bell); indexed. M. Barrows, New York. 1955. $3.95

All home gardeners will be interested, if not thoroughly delighted by Helen Van Pelt Wilson's new book, *Climbing Roses.* What will please gardeners most is that, according to Miss Wilson, climbers need not be pampered; they are the easiest of roses to grow. In fact, if they are to blossom to their fullest, she cautions gardeners against overzealous pruning, feeding and disinfecting. She recommends, for example, little or no pruning unless there is a purpose of direction that must be achieved.

This seems particularly significant to me. Following the exception to the rule that heavy pruning forces growth and more blossoms, I treated hardy hybrid tea roses like climbers by pruning only lightly and removing dead growth, and they produced more flowers and were more resistant to disease than those severly pruned.

Since climbing roses are among the most attractive and practical garden plants, Miss Wilson's book is indeed a welcome addition to any gardener's library. It is an excellent guide, since it gives a great deal of information about many varieties of climbers, and about seventy-five particular types which the author singles out for special attention. Included are also illustrated directions for planting and special care. Of unusual interest is one chapter on places to plant climbers, some quite unique, and another on companion-plants for the different types of climbing roses.

A. D. MOLLIN
Great Neck, N. Y.

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HOLIDAY FLOWER ARRANGEMENTS. Edited by Emma H. Cyphers. 127 pages, illustrated, indexed. Hearthside Press, New York. 1954. $2.95

This book is a valuable compilation for either the experienced or young garden clubber, whether she seeks to exhibit at flower shows or obtain the maximum effect of decoration in her home.

Packed between its covers, and given in clear and concise text, are many suggestions for holiday decorations. It begins with Thanksgiving, then on to a very exciting chapter on Christmas ideas, an entire chapter devoted to Easter decorations, and closes with "Celebrations around the Calendar." In this last chapter, the hostess will find many ideas and suggestions for holiday decorations in each month of the year.

There is also a valuable list for special occasions, such as weddings, anniversaries, symbolic flowers, signs of the Zodiac, state flowers, language of flowers and a calendar of holidays generally observed.

And with all this, there is a delightful portfolio of photographic illustrations of blue ribbon arrangements.

This authoritative book is recommended to all those who are eager to improve the quality and beauty of holiday decorations.

ESTHER WHEELER
Roslyn Heights, N. Y.

FIELD CROP PRODUCTION. Harold K. Wilson and Will M. Myers. 674 pages, indexed, illustrated. J. B. Lippincott, Philadelphia, Pa. 1954. $

Field Crop Production was written as a textbook for an elementary course taught at the college level. The general scope of the book is complete, and the contents well organized and presented in a logical manner. Individual forage crops are discussed in adequate detail. Accepted practices in forage crop production and management are carefully described and the reasons for these practices are explained. The authors have not overlooked recent advances in forage crop improvement, production, preservation and utilization.

The coverage on corn and small grains is not equal to that of forages. The varieties listed for a few crops are out-of-date by several years. New techniques in tillage, cultivation, fertilization, and harvesting receive little or no attention. The discussion on weed control is very brief and inadequate for a college course.

The references cited for recommended fertilizer grades and rates of application were written more than fifteen years ago. Tremendous changes in fertilizer technology have occurred in the past decade and the information presented does not apply to present-day agriculture or economic conditions.

W. K. KENNEDY
Dept. of Agronomy
N. Y. State College of Agriculture
Ithaca, N. Y.

ELEMENTS OF ECOLOGY. George L. Clarke. 534 pages, illustrated, indexed. John Wiley, New York. 1954. $7.50

Several recent books have attempted to draw together the rather independent traditions of plant and animal ecology, and present the principles common to both in a form suitable as a beginning text rather than a reference work. The importance of ecology as a science committed to integrating our knowledge of the diverse relations between organisms and their total environment, and the resulting need for integrating the many separate ecological viewpoints, are concisely set forth in the first twenty-two pages of Dr. Clarke's "Elements."

In view of this major aim, and his statement that "the 'real life' of the organism, on which its growth, distribution, and multiplication depend, necessarily involves the simultaneous and continuing impact of all existing factors and also influences that occurred at earlier stages in the organism's experience" it may seem paradoxical that this book carries the "analytical approach" so abruptly into the chapters on the separated environmental factors: "The Medium," "The Substratum," "Water," "Temperature," "Light," "Oxygen and Carbon Dioxide," and "Nutrients." Gradually more complex and comprehensive problems are developed in later chapters on relations within and between species, biotic communities, succession, population fluctuations and finally the dynamics and productivity of various ecological systems of "ecosystems."

Brief discussion of hundreds of well-chosen literature references and attractive figures illustrates many problems, but glosses over the complexities and disagreements which would have to be met squarely in a basic understanding of even a few chosen examples. Drawing upon his background at Harvard and Woods Hole Oceanographic Institution, Dr. Clarke has emphasized quantitative data, but generally without mathematical or statistical analysis.

JERRY OLSON
Forestry Dept.
Conn. Agr. Exp. Station
New Haven, Conn.

TOBACCO DICTIONARY. Edited by Raymond Jahn. 199 pages. Philosophical Library, New York. 1954. $5

A dictionary is not the book one normally picks out with which to settle down for an evening. A big surprise, however, awaits the interested reader who opens Raymond Jahn's *Tobacco Dictionary*. From "abridora" (opener) to "zorullo" a fascinating tale picks its way through the commentary type definitions.

The words are familiar, yet they are part of a wholly separate language — the language of tobacco. This makes it a story as well as a dictionary.

When you've looked up a chance expression such as "pipe-walk" and satisfied the original query, you automatically read on and glean many more facets of the tobacco story. One of these facets is the abundance of slang expressions. Perhaps a little too numerous when some terms widely used in certain sections are not included. For instance "bent" is not only a type of pipe but describes a unit area of tent in the shade tobacco culture of the Connecticut Valley.

In a few other places the definitions are not wholly in agreement, for instance, "ferbam" is described as a chemical specific for control of blue mold. Three trade names are given; "Fermate," "Ferradow" and "Nuleaf." "Fermate" is then described with the chemical name for which "ferbam" is a coined nickname, i.e., ferric-dimethyl-dithio-carbamate. Next "Ferradow" and "Nuleaf" are described as common names for "a chemical preparation used in insect control" with no mention made of blue mold or ferric-dimethyl-dithio-carbamate.

On the whole, however, Mr. Jahn has done a wonderful job in placing between the same covers the concise essentials of several dozen specialized dialects which make up the tobacco language spread all over the smoking world.

GORDON S. TAYLOR
Asst. to Director
Tobacco Laboratory
Windsor, Conn.

SOIL FERTILITY. C. E. Millar. 436 pages, illustrated, indexed. John Wiley, New York. 1955. $6.75

C. E. Millar has brought together and condensed in very readable manner the present concepts on soil fertility. This book is written primarily for use as a textbook. The author develops the subject in a logical and orderly manner. Of the nineteen chapters in the book, the first four deal with the history of agriculture, the usual discussion of light, heat, air and water as the other essential factors in plant growth, and the role of soil colloids and the soil solution on nutrient absorption by plants. Because of their great influence on soil fertility, soil reaction and liming, and soil organic matter are discussed in two chapters preceding the section in which nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, and the trace elements are given individual chapter discussion. There follows a very interesting chapter on soil deficiencies and the problem of determining the nutrient needs of crops. The latter third of the book deals with soil organisms, animal and vegetable manures, composts, the commercial fertilizer industry, crop rotations and farming systems. The final chapter is a summary of the results of the famous old fertilizer experiments from which so many fertilization practices were determined.

This is certainly the most up-to-date treatise on the subject of soil fertility of its kind. It is written without the use of highly technical expressions and with enough positivity to leave the reader fairly sure of the essential facts about most of the things which influence the fertility of the soil.

Dr. Millar has drawn very heavily upon the results of American investigations to illustrate and demonstrate the points which he wishes to make. During the last fifty years a tremendous amount of research work has been done on soil fertility in the United States. But a great many of the experimental results have only confirmed facts already discovered by earlier workers, many of them in other countries.

For anyone interested in refreshing their knowledge of the relationship between soil fertility and crop production this book is to be very highly recommended.

RUSSELL B. ALDERFER
Chairman, Soils Dept.
Rutgers University

(Continued on page 172)

Any books reviewed in this number or in previous numbers of The Garden Journal may be ordered through:

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NEWS, NOTES and COMMENTS

Theater Benefits. The New York Botanical Garden has two wonderful shows to offer its Theater Benefit patrons this year.

We have secured Alfred de Liogre's production of "Janus," starring Margaret Sullavan, Robert Preston, and Claude Dauphin. The play, a comedy, will open at the Plymouth Theater in mid-November, and the date of our benefit performance is November 30. Tickets will be priced at $25, $20, $15, $10, and $7.50, with orchestra, mezzanine, and box seats only available.

When we heard that Rogers and Hammerstein will produce a new musical called "Pipe Dream," starring Helen Traubel and Bill Johnson, we felt it was a perfect opportunity for a winter Theater Benefit. We were fortunate in securing February 7 for our benefit performance of this top-priority show. Tickets will be priced at $27.50, $25, $20, $15, $10, and $7.50 with orchestra, mezzanine, and box seats only available.

Proceeds from both theater benefits will help to support the Garden's over-all program of exploration, botanical research, horticulture, and education.

Reservations will be taken at The New York Botanical Garden's downtown office, 22 East 60th St., New York 22, N. Y. — or by calling PLaza 3-8462.

Educational Program. The Educational Program, 1955-56 edition, of The New York Botanical Garden was published recently—and copy may be had on request.

The Educational Program has been expanded to include several new courses in garden study and planning, flower arranging, and allied subjects.

For the convenience of busy people many of these courses are now being offered in the mornings as well as evenings.

Recognition to Dr. Dodge. Dr. Bernard O. Dodge, Plant Pathologist Emeritus of The New York Botanical Garden, has been elected a foreign member of the Linnaean Society of London and received the accompanying diploma. The inscription thereon reads:

"Since by a vote the Linnaean Society has wished a man well deserving in the advancement of science, the Master Doctor Bernard Ogilvie Dodge, to be among those members whom it recognizes from foreign parts, by the order and in the name of our society we testify that he has been duly elected on the twenty-fourth day of May, 1955. In testimony whereof this diploma having been given, we have inscribed our signatures, and have moreover affixed the seal of our society on the second day of June, 1955."

Staff Member Receives New Designation. Dr. William J. Robbins, Director, announces that the title of Dr. Richard M. Klein has been changed from Research Associate to Assistant Curator of The New York Botanical Garden.

Dr. Ralph Stewart on Sabbatical Leave. Dr. Ralph Stewart, principal of Gordon College, Rawalpindi, Pakistan, spent ten days at The New York Botanical Garden, looking up literature in the library on plant material from his part of the world. Dr. Stewart brought several rare plant specimens from Baalbeck where the ruins of the Temple of Baal are located. Some of the individual stones in the temple weigh eight hundred tons—yes, tons, not pounds—and were brought all the way from upper Egypt, while others came from a mile or so away.

Dr. Stewart has been on Sabbatical leave since March 15 and visited Beirut and Istanbul en route to England. He spent some time at Kew and the British Museum and will stop at these two institutions on his way back to Pakistan. While in the States, Dr. Stewart enjoyed visits with his family in Colorado and Wyoming.

Ernest Chabot. Ernest Chabot, prominent in horticultural circles over a period of years, died suddenly on July 2, 1955, at the age of fifty-two. Mr. Chabot was advertising manager of Lord & Burnham, Irvington, N. Y., editor and author of several books on greenhouse plants and of many articles in "Flower Grower," "Popular Gardening," 'Better Homes and Gardens," and the garden department of The New York Times. He was active in the Men's Garden Club of America, Inc., and a member of The New York Botanical Garden, and a number of plant societies.

National Arbor Day. The Executive Committee of the National Shade Tree Conference has approved sponsoring a National Arbor Day Association by the Conference. Dr. P. P. Pirone, Plant Pathologist of The New York Botanical Garden, served on the special committee to investigate the feasibility of forming a National Arbor Day Association under the sponsorship of the Conference.

Course for Exhibitors and Judges. The Federated Garden Clubs of New York State, Inc., will conduct Course 1 for Flower Show Exhibitors and Judges at the Little Theater, Westchester County Center, White Plains, N. Y., Sept. 21-23, 1955.

Mrs. Gerson T. Hirsch, Staging Chairman for the two Ninth District Shows at the Center, will discuss "Flower Show Practice," Dr. Robert E. Lee of Cornell University will lecture on "Types of Plants Growing Exhibition Material" on the first day; Mrs. Milton Hescock, horticulturist and artist, will give two talks, "Elements of Flower Arrangement and Preservation of Plant Material" and "History and Background and Types of Arrangements" on the second day.

On the third day written examination will be given for those wishing credit toward judges' certificates.

Price of entire course to Federated Garden Club members of any state $10.00, to non-members, $15.00. Application and check (payable Ninth District Federated Garden Clubs New York State, Inc.) should be sent to Mrs. Harvey Albert, 418 Warren Ave., Mamaroneck, N. Y.

SOCIETAS LINNÆANA LONDINENSIS

Cum SOCIETAS LINNÆANA suffragiis latis virum optime in augenda scientia merítum Dominum Doctorem

BERNARD OGILVIE DODGE

inter socios illos esse voluerit, quos e peregrinis adsciscat, jussu et nomine societatis nostræ testamur nos illum rite electum esse quarto et vicensimo die Maii MCMLV. Cujus rei in testimonium dato diplomate, chirographa nostra inscripsimus, et insuper sigillum addimus societatis nostræ altero die Junii MCMLV.

H. Hamshaw Thomas — Praeses

Ærarii Praefectus

a Secretis

This is not only a good show report, but also furnishes straight forward comments on notable hybrids and tree peonies.—The Editor

Peonies On Show. The number of entries in the Fifty-First Annual Exhibition of the American Peony Society, held in Chicago, June 5 and 6, 1955, was high, and the blooms were above average. The Show was a definite attempt to advance from the "milk-bottle" class. Step-type benches were employed; these were covered with sandalwood-colored, coarse basket-weave material, and the milk bottles were obscured with a dark green crepe-paper tubing.

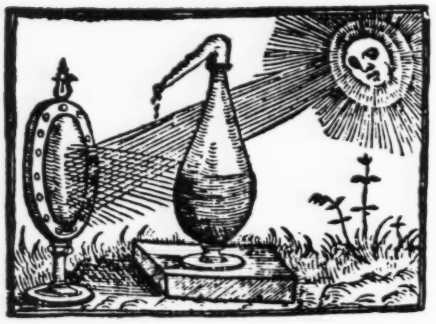
The 'Court of Honor' varieties, the best of their respective classes, follow: blush—'Florence Nicholls;' light pink—'James Pillow;' medium pink—'Ensign Moriarity;' dark pink—'President F. D. Roosevelt;' red —'Bonanza;' semi-double — 'Mr. L. van Leeuwen;' Japanese — 'Soshi;' single—'Sea Shell;' hybrid — 'Black Monarch;' tree peony—'Golden Bowl'; white, 'To Kalon' (meaning 'The Beautiful').

The James Boyd Memorial Medal, donated by the Pennsylvania Horticultural Society, on a year-to-year basis, was awarded by the American Peony Society to Silvia Saunders of Clinton, New York, for her exhibit of hybrid tree peonies. Miss Saunders is the daughter of the late Prof. Saunders, who did so much research work on and hybridizing of peonies.

American Peony Society medals were awarded as follows: Gold to Dr. D. S. Hyde for the best fifty varieties in Class A; silver to D. B. Gorski for the best twenty-five varieties in Class B; bronze to Mrs. J. Reinhart for the best ten in Class C, to Dr. Hyde for the best single in the show, to Roy Gayle for the best Japanese in the show, and to M. C. Karrels for the best hybrid in the show. The B. H. Farr Memorial Medal was awarded to Dr. Hyde for the best double albiflora variety in the show.

The focal point in the exhibition for both the members of the peony society and the visitors was the section where the sensational hybrids and tree peonies were exhibited. Probably at no flower show on this continent in the past have these types been so copiously shown. It was a surprise package! For many years, the annual exhibitions contained very few of them; recently, there has been a tremendous interest by all peony

(Continued on Back Cover)



LET THERE BE HERBS

"About Michaelmas (sooner or later, as the season directs), the Weather fair, and by no means foggy, retire your choice greens and rarest plants . . . into your Conservatory."

JOHN EVELYN, *Kalendarium Hortense.*

If your rosemaries and baies have grown so large in the garden that they no longer fit clay pots, secure from your favorite florist some of the handsome wooden tubs used for potting ferns. They come in green or chaste white surrounded by a gold band. The latter makes a most decorative container for a big rosemary. Such a plant would be a fair and lasting Christmas gift for an invalid or any one with a sunny window.

When planting wooden tubs, place a layer of large stones in the bottom to provide for drainage. Have the container large enough to allow an inch or two of fresh soil (one third sand, one third peatmoss with lime or rotted compost, one third garden earth) above the root ball. If the plant is too large to permit this, remove a couple of inches of the compact soil atop the roots. Often you can pull off a side shoot or two in the process to start a new rosemary *(Rosmarinus officinalis)* or sweet bay *(Laurus nobilis)*. After years of trying to root cuttings of the latter, I found that this is the easiest way to propagate it. When scraping the soil away from the trunk of the plant, look for branches which can be pulled off with some roots attached.

The smaller culinary herbs do very well when planted in a large pottery or clay strawberry jar. There is room enough for roots of those plants which would be tall in the garden, such as dill, fennel, lovage, or even borage, in the center core. The sloping sides and generous pockets of the jar allow for trailing plants, such as sweet marjoram which, when potted, does not like to have its foliage sitting on moist soil. While sun-loving basil prospers on the sunny side of the strawberry jar, delicate, shade-loving chervil will grow quickly from seed sown on the opposite side.

Insert a length of plastic pipe, of small diameter, cut shorter than the top of the jar, in the center before filling it with soil. The tubing acts as a watering device, if holes are pierced in it on all sides. (This can be done with a pen knife or heavy kitchen shears.) Plant from the bottom, laying the roots of the taller herbs such as borage or dill as far towards the middle of the jar as possible. Do not worry about the plants adapting themselves to the contours of their container. They seem to know how to dwarf themselves and turn upward from their position in the pocket in the most graceful manner. Leave the top pockets for sweet marjoram which can be divided, when taken up from the garden, to fit the space. Being a perennial when not exposed to cold, marjoram will soon develop into a thrifty plant from even a small section of a bigger plant in the garden.

One year I placed a plant of alpine strawberry 'Baron Solemacher' atop the strawberry jar; it flowered and fruited all through the winter to the amazement of our whole household.

Look about the garden for volunteer seedlings to plant in your winter window herb garden. Little catnips, fennels, borage, chives, and parsley which may have self-sown from last season's plantings will be just right for potting at this time. Chervil and garden cress or peppergrass may be sown in the pockets, following any of the seedlings which grow too tall and have to be pulled out towards mid-winter. The woody herbs such as thymes, sage, winter savory, and rosemary do not seem to do as well in a strawberry jar as the more succulent annuals and tender perennials.

GERTRUDE B. FOSTER

BOOK REVIEWS (from page 170)

PRACTICAL HORTICULTURE. James S. Shoemaker and Benjamin J. E. Teskey. 374 pages, illustrated, indexed. John Wiley & Sons, New York. 1955. $4.20

This book has been written primarily as a text for students of vocational agriculture and as a reference and a guide to home horticultural operations.

The growth of a wide variety of plants is followed from seeding to harvest. The authors include all details on varieties, propagation, planting, pruning, weed and other pest control, harvest, storage, and necessary general cultural operations.

Landscape gardening and design, the gladiolus and dahlia, flowering bulbs, growing transplants, vegetable vine crops, cabbage family crops, the pod vegetables, corn, apple and pear, stone fruits, grapes, and strawberry growing are covered individually.

Also accorded special chapters are: annual, biennial, and perennial flowers; lily, iris, peony; dwarf fruit trees; currants, gooseberries, blueberries, and cranberries; and other varieties and methods occurring in a typical garden year.

Both authors are at the Ontario Agricultural College where Dr. Shoemaker is professor of horticulture and head of the department and Mr. Teskey a lecturer in horticulture.

This book is highly recommended for the usual home gardener. It will also be invaluable for the advanced amateur specialist particularly in fields outside of this specialty.

R. H. SUDDS
Dept. of Horticulture
University of Connecticut
Storrs, Conn.

MOSSES. A New Approach to the Identification of Common Species. E. T. Bodenberg. 264 pages, illustrated, indexed. Burgess Publishing Co., Minneapolis, Minn. 1954. $5

This new manual is a welcome addition to the all too few books on mosses for the general naturalist. The absolute beginner has several older books to choose from; the specialist is reasonably supplied by the Moss Flora of North America and The New York Botanical Garden's still incomplete North American Flora. Prof. Bodenberg's book lies between these two extremes. It is addressed to those who are not frightened off by technical terms if they are clearly defined, who prefer scientific names to invented "common" names, and who want to know something of the nature as well as the names of mosses. In difficulty this book is somewhere on the far side of Grout's *Mosses With a Hand Lens* and on the near side of Conard's *How to Know the Mosses*. Both of the latter include liverworts, as the present book does not.

The new approach of the subtitle is the ecological approach, and one of the most useful sections of the book is the extensive series of tables showing habitats, life forms, and seasonal aspects. There are good line drawings and the descriptions give interesting and useful information often of an unusual sort.

Prof. Bodenberg has anticipated in his preface the reviewers' likely complaints and I shall not wholly disappoint him in this regard. While it is clearly desirable to key plants to families, moss families are based on features which may be seasonal or minute. The result is that with this book, as with several others, the user has a hard time getting off the ground and must frequently have recourse to working backward from the pictures. A more serious criticism is of the small number of species included, namely one hundred and fifty species of true mosses for the whole of the United States. Granted that half, or even two-thirds, of the some fifteen hundred kinds of mosses known in temperate and arctic North America are rare, local, or taxonomically picayune, nevertheless the user will search in vain for the names of many of his common collections. The intelligent and industrious naturalist, who will recognize the excellence of what is here included, will feel deprived of what is not. This reviewer recommends a supplement doubling the number of species.

GENEVA SAYRE
Professor of Biology
Russell Sage College

CHEMISTRY OF THE SOIL. Edited by Firman E. Bear. 373 pages, diagrams, tables; indexed. Reinhold Publishing Corp., New York. 1955. $8.75

This series of monographs portrays an excellent picture of our soil constituents, how they were formed, their chemical composition, including organic matter and the continually changing elements affecting plant growth. The fourteen authors, recognized authorities in their respective fields, discuss how our soils developed, their chemical composition, cation and anion exchange phenomena, soil organic matter, plant nutrients, oxidation processes, alkaline and acid soils, liming, trace elements, and plant nutrition. A chapter on soil analysis describes the methods of soil analysis commonly used by the New Jersey Agricultural Experiment Station.

The selection of authors, recognized as authorities in their particular fields, makes *Chemistry of the Soil* a valuable treatise for research workers, as well as producers of agricultural chemicals and the technicians responsible for their use.

FRANK APP
Director, Research Development
Seabrook Farming Corp.
Bridgeton, N. J.

NEWS, NOTES (from page 171)

fanciers and gardeners in both tree and hybrid peonies. Their present popularity is the straw in the wind and as root divisions become more plentiful, the present high prices will descend and there will be a very great demand for them. The possibilities for introducing distinct innovations in the albiflora species in any quantity are somewhat remote. So, this new look was a breath of freshness in a stagnant atmosphere and welcomed by all. Both the tree and hybrids have new and sensational colors, which are somewhat kindred to the vibrant brilliancy that one sees only in oriental poppies. The rich yellow of such herbaceous hybrids as 'Claire de Lune' and 'Oriental Gold' are not to be seen in the albiflora. Excellent yellows were also seen in the tree peonies.

In the following, the comments are confined to the hybrids and tree peonies.

The best hybrid in the show was 'Black Monarch,' one of the darkest flowers in the flowery kingdom. 'Red Charm,' a double with exquisite form and of a beautiful red without a trace of the objectionable blue tints, was sensational as it always is, either in the garden or on the show bench. 'Black Monarch' took both second and third in its class. The double and semi-double pinks hybrids are nearly all brilliant, vibrant and clear, very much apart from what one sees in the common albiflora. In this particular class, 'Nathalie' took first and second and 'Arbutus,' third. A group of three of 'Cythera' was a show piece of quality and an impressive sight.

Many of the single type hybrids were shown. 'Requiem,' a white, was the center of attention. 'Laura Magnuson' and its companion in that color break, 'Julia Grant,' were simply outstanding. These two, of a clear brilliant pink color, were jotted down as "a must to be obtained" in nearly every gardener's notebook. 'Ludvica' and the exotic salmon-colored 'Grace Root' also showed up very well. In red singles, "Illini Chief' was at the top. This hybrid is of bright orange, very different and off the beaten path. Its compelling color penetrated and commanded all visitors to stop and look. It was a bull's eye, if there ever was one. 'Sophie' and 'John Wister' were among the very elite red single hybrids.

The number of Japanese hybrids were, unfortunately, few. 'Prince Charming,' a dark red with a large center of yellow stamenodes, tipped red, was voted the best of this class. It certainly merited the nod of the judges. 'Edward Steichen,' a snappy red, was second, and 'Little Gem,' a black-red, third.

'Golden Bowl' was the best out of seventy-seven entries! It had to have class to get over the tape first, and it had plenty of it. 'Golden Bowl' is a cup-shaped flower, of a rather deep yellow, with scarlet flares. Everyone feasted on its beauty. This variety has a long stem, with the flower held above the foliage—a rare virtue in flowers of this type in tree peonies. 'Banquet,' a shiny, flat rosette of cherry-red, with a brilliant dark center and yellow undertones, was the second best tree peony in the keenest of competition. 'Chinese Dragon' was third; it is a bright red semi-double with crinkled red flares running into the golden center. It was simply grand.

FRANCIS P. TIKALSKY
La Grange Park, Ill.

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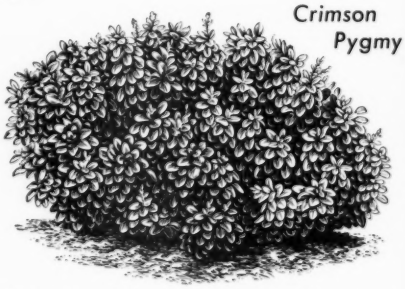

Crimson Pygmy

Campanula, *Wedgewood.* An engaging little dwarf that will capture your heart. From a cushion of lush, deep, green foliage, dozens of brilliant, violet-blue flowers look skyward with twinkling gaiety.

New **Dwarf Barberry, *Crimson Pygmy.*** It's not surprising that demand for this choice, new, miniature, red-leafed Barberry has been so overwhelming. The glowing color and rare charm of the bushy, low growing plants are quite irresistible. Bronzy, blood-red leaves sparkle with brilliant highlights in the sunlight. Stunning in front of shrubs, along walks or as a specimen. Requires no pruning.

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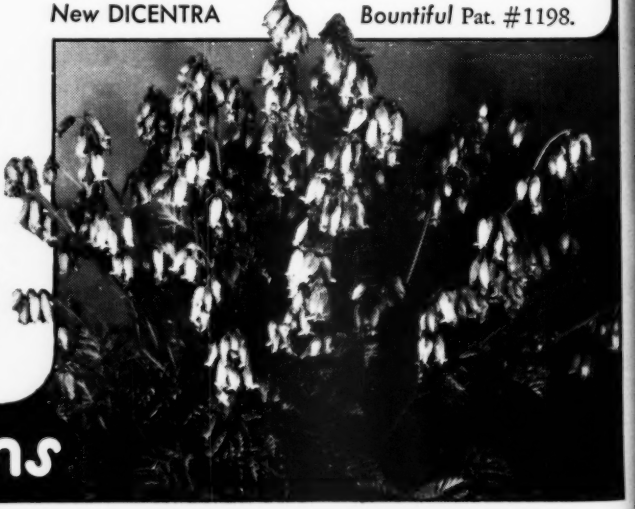

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